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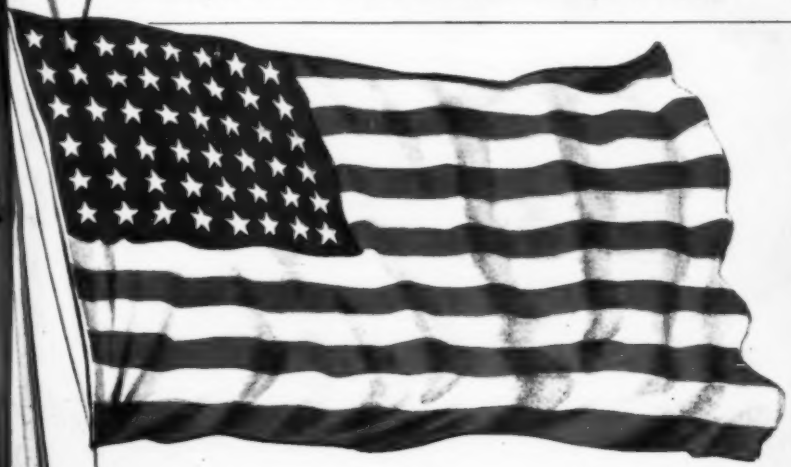
JULY, 1944

Industrial FINISHING

Published Monthly in the Interest of Modern Production Finishing



I AM OLD GLORY: For more than eight score years I have been the banner of hope and freedom for generation after generation of Americans. Born amid the first flames of America's fight for freedom, I am the symbol of a country that has grown from a little group of thirteen colonies to a united nation of forty-eight sovereign states . . So long as men love liberty more than life itself; so long as they treasure the priceless privileges bought with the blood of our forefathers; so long as the principles of truth, justice and charity for all remain deeply rooted in human hearts, I shall continue to be the enduring banner of the United States of America. I AM OLD GLORY.

LILLY VARNISH COMPANY, INDIANAPOLIS, INDIANA
THE LILLY COMPANY, HIGH POINT, NORTH CAROLINA

MEET THE CH

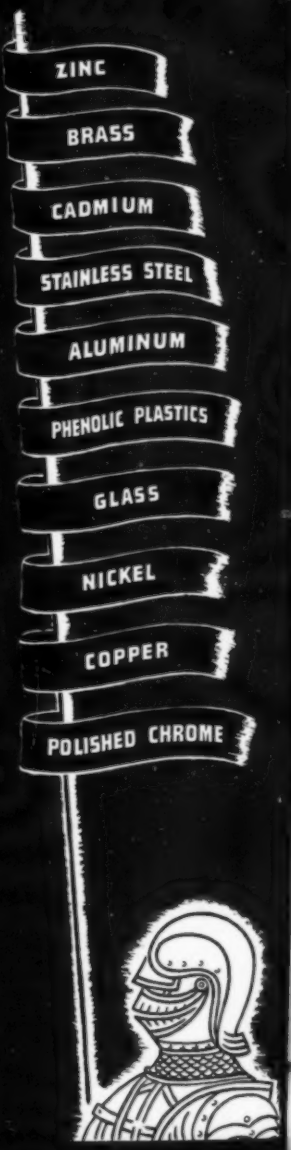
plastic-base PALADIN conquers 10 hard-to-finish materials

For all-around serviceability on hard-to-finish materials you can't beat Roxalin's Paladin. You can apply it to cadmium, zinc, brass, steel, aluminum, polished chrome, copper, nickel, glass or phenolic plastics. You can dip, spray or roller coat—air dry or heat cure it. The roughest handling, the toughest service tests won't loosen Paladin's bulldog grip.

Inside or outdoors, Paladin can take it. Salt spray, humidity and solvent resistance are inherent in this plastic-base coating. Its super flexibility permits blanking, forming or extruding *after* finishing.

Greater latitude can be given to your designers where it is desirable to use several types of metals in the same product. With Paladin it is no longer a problem to specify a satisfactory over-all finishing schedule. There is a job for *versatile* Paladin in your plant. Write for technical specifications.

ROXALIN *Flexible* FINISHES
INCORPORATED
ELIZABETH • NEW JERSEY



A CLEAN PART for A FRESH START

IN 60 SECONDS, sometimes less, sometimes as much as five minutes, Enthone Enamel Stripper de-coats baked synthetic enamels of the following types:

UREA-FORMALDEHYDE	RESYL
GLYCEROL-PHTHALATE	GLYPTAL
PHENOL-FORMALDEHYDE	MELAMINE

It's many times faster than the best type of caustic strippers.

A PRODUCT OF PIONEERING RESEARCH—first of its type to be synthesized, marketed and patented.* It is an emulsion, used diluted with water at room temperature or heated up to 180° F.

FAST ACTION—The action on the enamel is physical rather than chemical. First it contracts, then lifts and slips off without trace or blemish. No sign of pigment or solid residue is left on the work as in the case of caustics.

BASE METAL UNDEFILED—Enthone Stripper is mildly alkaline (pH 9-10) and does not attack steel, zinc, aluminum and magnesium or other metals. Anodized aluminum is unharmed and can be re-enameled without re-anodizing.

SIMPLE OPERATION—Work to be stripped is dipped in a tank containing the solution in the usual manner, mechanically or manually, and remains just long enough to remove the enamel. Then rinse in running water and dry. It is now ready for refinishing. Write today for FREE TRIAL SAMPLE.

THE ENTHONE CO.

441 Elm Street **New Haven, 2, Connecticut**

*U. S. Patent 2,243,106

ENTHONE ENAMEL

STRIPPER

NO CAUSTIC ACTION

for SYNTHETIC ENAMELS . . . . . Urea-formaldehyde, Resyl, Glyptal, Glycerol-phthalate, Etc.

TWENTIETH YEAR OF PUBLICATION

Industrial FINISHING

W. H. ROHR, Editor E. A. DOSCH, Assoc. Editor

Vol. XX, No. 9 JULY, 1944 $2.00 a Year

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It's the FOLLOW THROUGH that counts

. . . even with
U. S. ARMY SPECIFICATION
NO. 3-181
Rust-Inhibiting,
Olive Drab Enamel

If you are having any difficulty with this new one-coat finish—or are dissatisfied with the production you are getting—perhaps our technicians can *help you*, as they have others in recent months.

Properly made and effectively applied, this new enamel provides an excellent, enduring finish over phosphate-treated or solvent-cleaned steels—for Landing Mats, Metal Ammunition Containers, many other war materials now high on the Priority List.

Can we give you a *lift* on one of these programs—either with early delivery of the enamel or technical help in making it work?

Vedoc

LIQUID PLASTICS DIVISION
FERRO ENAMEL CORPORATION
CLEVELAND 5, OHIO

Attack!

on the industrial front

● The strategy of *attack* is just as important in meeting production problems as on the battlefield.

Glidden's policy of constant research—of anticipating problems and coming to grips with them has quickly overcome many baffling finishing problems. Many Glidden developments are already in the field being practically tested preparatory to postwar production.

In the field of industrial finishing Glidden has a lot to offer *you*. If we don't have an immediate answer to your problem, we have the means and facilities to "attack" it quickly and find the answer in the shortest possible time. This goes for present or postwar requirements.

Just drop us a line.

THE GLIDDEN COMPANY • Cleveland 2, Ohio

TIME-TESTED

SURFACENE COMBINATION STAIN AND FILLER

One coat application against conventional two coats.

Saving—one application—one handling.

Five hours air dry for recoating, against 48 hours normal dry of Water Stain and Filler.

One hour dry at 140° F. with controlled humidity.

Clarity of Water Stains.

★ ★ ★

Also Surfacene Pigmented Wiping Stains, Glazes and Toning Stains.

GLIDDEN *Pacemaker in Paints*

Letters from Readers

Lacquer Dipping

Please send us any magazine or booklets on lacquer enamel dipping, as we are interested in learning how to dip the side pieces of our wheelbarrows. . . . The side pieces measure 8x15-in.—N. S. Co.

Detearing Methods

We are confirmed readers of INDUSTRIAL FINISHING Magazine, and thought that you might be interested in hearing an opinion direct from an appreciative reader: "The educational articles on production painting methods are of unestimated value to us."

Right now we are interested in knowing if you could furnish us with information pertaining to detearing methods used in dip painting. — W. Specialties.

Thank you. Information supplied.—ED.

Toxic Wood Repellent

We are interested in finding the source of what we believe is known as "toxic wood repellent," or possibly some other name. It is a solution that is used for a first coat on green lumber, that will seal for the final coat, and also incidentally, lay the fibers down.—United Pressed Products Co.

We are sending you names and addresses of firms who, we think, can supply what you want.—ED.

We Know Roller Coating

Your May 1944 issue (page 8) contains two inquiries on roller coating machines. We would appreciate further information as to complete names and addresses of interested firms, in order that contact might be established.

Our background in building roller coaters and furnishing tailor-made finishes to be so applied has established a reputation of which we feel justly proud. It covers the tin-plate field, Venetian blinds, toys, razor blades and varied industries. We have gathered enough information over a period of years to enable us to iron out all the kinks with minimum time and effort.—A. C. Jones Co.

Spatter-Proof Paint

We are interested in obtaining information about spatter-proof paint. We would like to know the manufacturer of the product, as described on page 62 of May 1944 issue of INDUSTRIAL FINISHING magazine.—G. E. Co.

Information supplied.—ED.

Conveyorized Finishing

Please send tear sheets of past articles on production cleaning and finishing by continuous moving overhead conveyor line for metal cabinets; more specifically, vertical filing cabinets. Also, catalog list of suitable equipment.—S. Steel Equipment Co.

Flame-Proof Paint

On page 76 of the May 1944 issue of INDUSTRIAL FINISHING, there is an article on "Flame-Proof Paint." Could you kindly send us the manufacturer's name and address?

We have wooden deck ways and these are subject to sparks and flames from acetylene burners, welder's flame scaling, etc. They also get heavy use by timbers being dragged on them, steel dropping and being walked on. We need a fire preventive coating that will conform to the above requirements. Of course, these deck ways will be gone over from time to time and kept in good shape.—N. Shipbuilding Corp.

Name and address given.—ED.

Hardens Soft Woods

We are sending you a clipping from our leading morning paper, "The Sydney Morning Herald," indicating that a method has been found which will harden soft timbers. We are interested in this discovery, as in our industry certain timbers of definite hardness are necessary but are not obtainable in our country. Although we have over 400 varieties of Australian hard-

SAVE
Man-Hours

USE
PERFECTION
SYNTHETIC
Flat Finishes

Perfection's unique blend of fossil gums and gloss varnish provides all the beauty of rubbed finishes—WITHOUT THE RUBBING—saving countless man-hours of labor. Here is a clear and transparent finish—impervious to alcohol and water—free from orange peel—and available in a full range of sheens that will not change on standing. Put efficient, economical Perfection Flat Finishes to the test in your plant.

PERFECTION PAINT & COLOR CO.
Indianapolis 2, Indiana

woods, they are mostly too refractory for our specific purpose. We would appreciate it very much if you could forward us some technical information regarding the use of Dimethiolurea.—Beale & Co., Ltd., Sidney, N. S. W., Australia.

Regarding your request to INDUSTRIAL FINISHING Magazine for further information on the recently announced process for treating soft woods to improve their properties, we are sending you a brochure describing the process and the chemicals involved. We trust you will find it of interest.—Ammonia Dept. of The Du Pont Co.

Painting Nails

On page 84 of the April issue of INDUSTRIAL FINISHING, we noticed some correspondence regarding information on painting nails. We also would like to have this information on painting nails.—S. I. Co.

We have suggested dipping, tumbling and whirling methods of coating nails, and have submitted names and addresses of concerns who may supply some of this equipment.—ED.

Zinc Chromate Primer

We would appreciate it very much if you would forward us a reprint of "The Theory and Use of Zinc Chromate Primers," by Paul O. Blackmore. We saw the article on this when looking through the May 1944 issue of INDUSTRIAL FINISHING. The information in this article will be of value and interest to us, for use in our Tool Engineering & Methods Department, Department No. 41.—D. L. S. Co.

Tumbling

We are trying to locate a tumbling barrel for applying lacquer to small wood and metal parts by means of the tumbling process. We will appreciate any assistance you can give us.—L. D. Co.

In the May 1944 issue of INDUSTRIAL FINISHING magazine there was an inquiry for information regarding wax, pumice and tumbling, for which you supplied the information desired. Would you be kind enough to forward this same information to us?—E. Co.

We are regular readers of INDUSTRIAL FINISHING and, as we are normally manufacturers of paints for industrial purposes, we are extremely

New Items? YES...

PLENTY OF THEM!!!

Tell us your finishing problems and we will tell you about the new items we have developed to solve them.

V. J. DOLAN & COMPANY, INC.

Manufacturers "Unquestionable Quality" Industrial Finishes

1830-32 NORTH LARAMIE AVENUE **CHICAGO, ILL.**

PRACTICAL *Laboratory Cooperation that really helps* **YOU!** Yes, that's the kind of help you get from Standard Industrial Products, Inc. For example, our technical staff has developed some unusually fine non-priority wood finishes for civilian furniture that are economical and dependable. Phone or write us today about any finishing problem!

Standard Industrial Products, Inc.

EVANSVILLE 4, INDIANA

Wear Master

The Plating Shop is the Place to Test Cleaning Compounds!

It is not what we say about PERMAG Compounds that counts—its the cleaning speed and power of PERMAG in producing a chemically clean metal surface for plating and finishing.

More shops than ever before depend on PERMAG Compounds. Details on request.

Magnuson Products Corp.
Mfrs. Specialized Cleaning Compounds
50 Court St., Brooklyn 2, N. Y.
Nationally Represented
Warehouses in chief cities.
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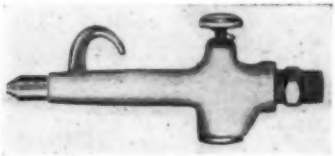
Montreal and Toronto



Leakproof Air Blow Gun

Use this gun for blowing dust, dirt or lint from the surfaces of parts and products to be coated with paint or any other kind of coating. It will improve your finish tremendously.

Also useful for blowing out moisture or other entrapped liquid from crevices, seams or indentations in parts to be cleaned or painted.

Fits comfortably in the palm of hand. Has button control air valve. Special composition washers prevent leakage. We can furnish any type nozzles—round, pointed, flat or 10-in. extension. Nozzles are interchangeable and renewable. Every plant should have one or more. Write us!

G. M. MANUFACTURING CO.
Engineers, Mfrs. of Complete Spray Equipment
216 N. Clinton St. Chicago, Ill.

interested in your publication and have derived considerable benefit from these pages.

We are anxious to obtain some information on the tumbling process for the finishing of small articles. We would be glad if you would send us any information you have on this process and also if you would be good enough to pass our inquiry to advertisers who may manufacture machines for this purpose.—F. E. & Co., London, England.

Information supplied.—ED.

Centrifugal Painting Machine

We have been asked what we knew about a paint spray gun that was on the market a number of years ago and known under the name of either Morris or Norris. Its distinguishing feature, our inquirer believes, was or is a centrifugal disc embodied in the gun to aid atomization. As we never heard of this gun, we are wondering whether you have.—P. B. Co.

The name was "Norris." Illustrated descriptions of the machine were published in INDUSTRIAL FINISHING several years ago. A recent letter from the former manufacturer states that manufacture of the machine was discontinued a few years ago.—ED.

Striping Tileboard

Please advise us whether or not you are acquainted with a manufacturer of a striping machine, suitable for striping tileboard.—S. Mfg. Co. (Plastic-Coated Wall Sheets—Baked).

Filler Rubbing Machine

Please supply us with the names and addresses of one or two manufacturers of a power filler-rubbing machine. We would like to locate a power-driven machine for rubbing fillers on mahogany veneered furniture.—A. M. Co.

Cigarette-Proof Lacquer

Could you furnish us with names of concerns manufacturing alcohol and cigarette-proof clear lacquer for wood finishing?—W. & M. Co.

Water-Soluble Paint

We are looking for a supplier of water-soluble paint for painting snow fence. Can you advise us on this item?—O. Industries.

BUY **EXTRA** BONDS ★ 5TH WAR LOAN

before *you take it easy, when you should be helping . . :*
before *you indulge, when you should refrain . . .*
before *you crowd the railroads by useless travel . . .*
before *you waste, when you should conserve . . .*
before *you spend just to be spending . . .*
before *you buy what you do not need . . .*
before *that vacation takes more than it should . . :*

think!

think of the Army and Navy that protects

you!

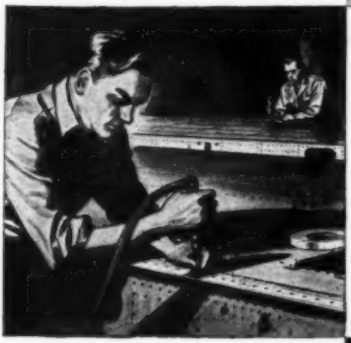
and help the war program!
ALL that you give, is little enough,
compared to the boys who give ALL!

STILLE-YOUNG
2300 N. ASHLAND AVE. • CHICAGO 14, ILL.

Do you know...?

Q. Today unit assemblies often reach the man who assembles them:
☐ In separate boxes ☐ Piece by piece
☐ In bundles

A. In bundles. The unit assembly of parts with Permacel tape is fast becoming a standard practice in plants. All parts needed for an assembly are taped together in stock room. Workers don't waste time searching through bins—no parts are lost or misplaced—inventories can be maintained in terms of complete unit assemblies.



Q. Cold flush rivets are often held in place for air hammer by:
☐ Tongs ☐ Tape ☐ Glue

A. By Permacel's companion, Texcel cellophane tape, specially processed. This durable, quick-sticking tape holds rivets in position in aircraft assemblies while air hammer operator works down the line. Eliminates waiting, prevents nearby rivets from falling out because of vibration, speeds production, cuts costs.

Q. Tape was often used in pre-war compacts to:
☐ Keep compact closed
☐ Keep powder dry
☐ Hold mirror in

A. Hold mirror in place. Before the war, a special Permacel double-faced tape used for this purpose was found to be far superior to glue, which becomes brittle. After the war this tape will again be available for this and many other jobs—such as holding protective linings in bathtubs during installation.

Quiz on timely production short-cuts—No. 4

Q. Biggest pre-war obstacle to shipping machinery overseas was:
☐ Corrosion ☐ High tariffs
☐ Shifting cargoes

A. Corrosion. But this is no longer true. Wartime experience in packaging tanks and planes for overseas shipment has proved that Permacel moisture-proof cloth tape (Utilitape) seals openings against outside moisture perfectly—helps eliminate the need for reconditioning plants abroad.

Q. Oxygen tent windows are sealed in order to:
☐ Keep bacteria out
☐ Prevent escape of oxygen
☐ Keep moisture in

A. To prevent escape of life-saving oxygen. Windows are often taped in with Permacel cloth tape (Jonflex) to help seal seams and joints—make it easy to remove and replace windows when tent is cleaned—eliminate tiny pinholes otherwise left by stitching.

Q. Which of these types of pressure-sensitive tapes can help speed and improve *your* production?
☐ Paper ☐ Cloth ☐ Cellophane
☐ Metal ☐ Glass

A. All of these types of Permacel tapes are today used in war production. Many war uses will prove helpful in your business when you return to post-war work. Meantime, our research laboratory facilities are available to you for development of special tapes to fit war or post-war needs.

Permacel
Industrial Tapes
INDUSTRIAL TAPE CORPORATION
New Brunswick, N. J.
Makers of Texcel Tape

LET'S ALL GET "STEAMED UP"

Gain the Victory Sooner, and....
Prepare to Meet the Postwar Challenge!

ALLIED VICTORY is in sight, and a final all-out push in the production of implements of war here at home to back up those on the battle fronts will hasten the hour of Victory. Let's ALL get "steamed up" to that end.

And then, the conversion to postwar production of civilian goods will commence. Again, WALKER'S specification finishes which are doing such a fine job now in parts and products coating for war purposes, will be available for peacetime application.

Walker is in position to supply what is needed, or can make it—primers, surfacers, lacquers, wrinkles, synthetics and special coatings—the best of finishes for application on metal, wood, plastics or any other materials being used.

"Call on Walker"

H. V. WALKER CO.
Elizabeth, New Jersey
MODERN PRODUCTION FINISHES

KOCH

Can Build the

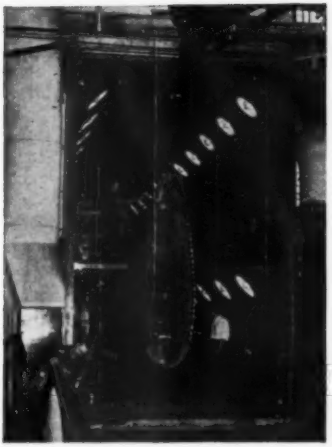
FINISHING SYSTEM

You Need!

KOCH has designed and built finishing systems, spray booths, dryers, humidifiers and conveyors for manufacturers of all types of products needing such equipment.

Many times, nationally known firms have selected KOCH equipment over competitive makes. The list includes leaders in the aviation, furniture, plywood, ordnance, plastics, metals and food processing industries.

Ask KOCH engineers to analyze your needs and recommend the proper equipment for your work.



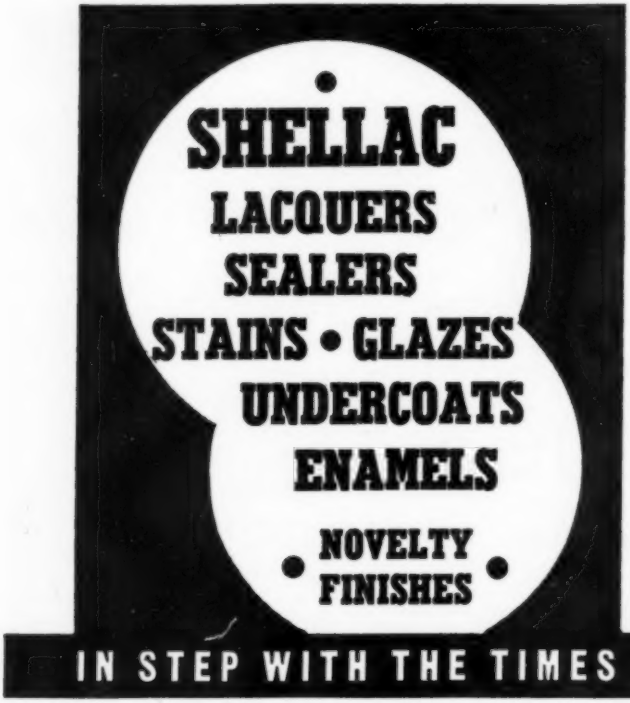
The Spray Booth that "Breathes"

This huge down-draft waterwash unit built by KOCH, "exhales" paint-laden air into a water system that washes it free of solids, and "inhales" a constant supply of fresh filtered air. Several spray guns may be operated at the same time—thus greater safety and health protection accompany faster, steadier production.

WRITE FOR COMPLETE INFORMATION—NO OBLIGATION

GEORGE KOCH SONS, INC. *Industrial Equipment*

2118 PENNA. ST., EVANSVILLE 4, IND.



IN STEP WITH THE TIMES

Industrial Finishes

that make the most of available raw materials to give you greatest durability, together with attractive appearance and economy.

• FOR APPLICATION BY ALL METHODS

JAMES B. DAY & CO., CHICAGO

Do you know...

that you can apply DESPATCH CONVECT-O-RAY to your present Infra Red finish baking system

Easily... Quickly... Inexpensively

to speed output by 133%

● Actual tests conducted by experts outside of the employ of Despatch, prove Convect-O-Ray when applied to infra red finish baking systems speed up production by 133%.

The application of Convect-O-Ray to infra red offers an amazing increase in finish baking efficiency as well as speed. Actual adaptation to your present system will be easy, quick and inexpensive.

Let Despatch engineers appraise your present infra red system and outline the possibilities with Convect-O-Ray added. No obligation on your part.

To get Despatch engineers' recommendation just send information about your present infra red system such as: *product baked, hourly capacity, operating temperature, time cycle, details of oven construction* and *floor plan of present system.*

DESPATCH FOR WAR

CONVECT-O-RAY

The new system that promises to revolutionize the finish baking industry.

WRITE TODAY for full details on how to adapt Convect-O-Ray to your present infra red system.

DESPATCH OVEN COMPANY MINNEAPOLIS

BAKING ENAMELS
LACQUERS
ENAMELS
SEALERS
PRIMERS

NEW PERIOD
WOOD and METAL
FINISHES

SYNTHETICS
VARNISHES
SHELLAC
FILLERS
STAINS
SUPPLIES

No. 100 NEW-LAC

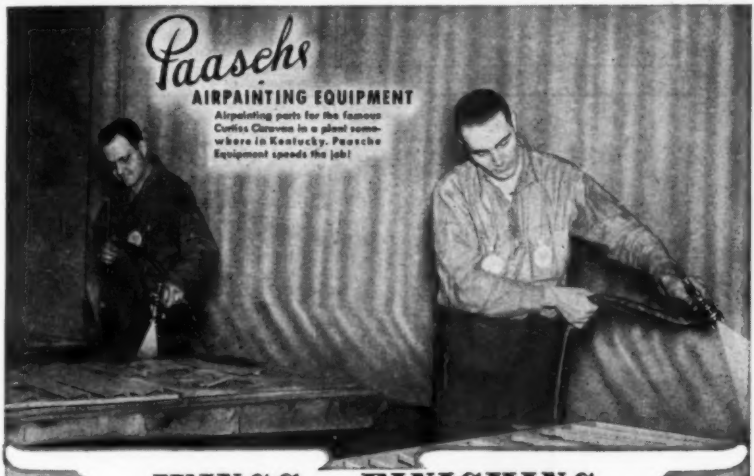
A New Clear Primer-Sealer

- Thins only with denatured alcohol in any proportion.
- Dries quickly to a brilliant, clear, pale, tough film on wood and metal.
- Has outstanding adhesion to metal . . Forms an excellent bond between any "Hard to Paint" surfaces and finish coats.
- No. 100 NEW-LAC is an exceptional shellac replacement.
- Sands easily to a smooth film.
- Seals all porous surfaces.

Quotations and technical information gladly sent at your request . . or order 5 gallon working sample at barrel price.

NEW PERIOD PRODUCTION FINISHES

NEW YORK WOODFINISHERS SUPPLY CO., INC.
109 IMLAY STREET BROOKLYN, N. Y.
Established 1917


Paasche
AIRPAINTING EQUIPMENT
Airpainting parts for the famous Curtiss Clipwing in a plant somewhere in Kentucky. Paasche Equipment speeds the job!

WINGS for FINISHING

When Paasche Airpainting Equipment works for you, Finishing flows along at top speed. Paasche High Production Airbrushes provide fastest application of painting and finishing materials. Exclusive design of Paasche Material Tanks saves time in paint handling.

But time-saving is only one of the many advantages gained. The Paasche Water Wash Booths (interior shown above) reduce fire hazards, provide healthier, cleaner surroundings for workers, conserve paint and save cleaning time and cost. Send for your copy of the new Paasche catalog and at the same time get the assistance of our experienced engineering staff. We will be glad to assist you on your difficult or unusual Finishing problems and help you attain maximum production.

Write PAASCHE AIRBRUSH CO., 1917 Diversey Parkway, Chicago 14, Ill.

Paasche Airbrush (Canada) Ltd. 110 Elm Street, Toronto

PUT THIS GUN IN THE HANDS OF YOUR FINISHING MEN

The Paasche CUB High-Production Airbrush provides extra rapid application of all painting and finishing materials; perfect atomization and spray pattern; it's easier to handle too, weighs only 22 ounces.

Paasche AIRPAINTING EQUIPMENT

Manual, automatic and special airpainting equipment, airfinishing booths, pressure regulators, airconditioners for compressed air lines, air dusters and stripers.

Coat the Trays in Tool Chests

with

Cellusuede FLOCK

Whether your product is tool chests, or something entirely different, chances are good that Cellusuede can heighten the beauty and utility of it immeasurably — and at low cost! In the case of the tool chest, the Cellusuede Flock coating protects both tools and chests from undue wear and scratching, and gives the chest a new richness in appearance. Try an application of Cellusuede Flock on your product and see for yourself how inexpensively you can create an attractive, new effect. Cellusuede Flock comes in a wide assortment of colors and is available for immediate delivery.

Write for Color Card, Prices, Samples

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ROCKFORD, ILLINOIS

QUALASOLE

America's finest Padding lacquer

The Gem of Lacquer Finishes

Ask for the Booklet

"The Finish of Your Lacquer Problem"

QUALATONE PRODUCTS, INC.

21 GAY STREET NEW YORK 14, N. Y.

Emblem of laboratory-tested

WARTIME FINISHES

...proven in service

This shield is your assurance that every finishing material furnished by The P. D. George Company has been tested and recommended by our laboratories for your particular requirements.

In war, as in peace, this policy is a fundamental part of Pedigree service to American industry.

THE P. D. GEORGE CO.

SAINT LOUIS, U. S. A.

QUICKER FINISH

with Lacquer

NITROCELLULOSE LACQUER is the finish to use when you are working against time. You can make earlier deliveries because lacquer is easy to apply . . . quick to dry. It requires no special drying or baking equipment.

For economy, speed, and a lasting finish with good appearance . . . use Nitrocellulose Lacquer.

Nitrocellulose Lacquer—the postwar finish on today's war-products.

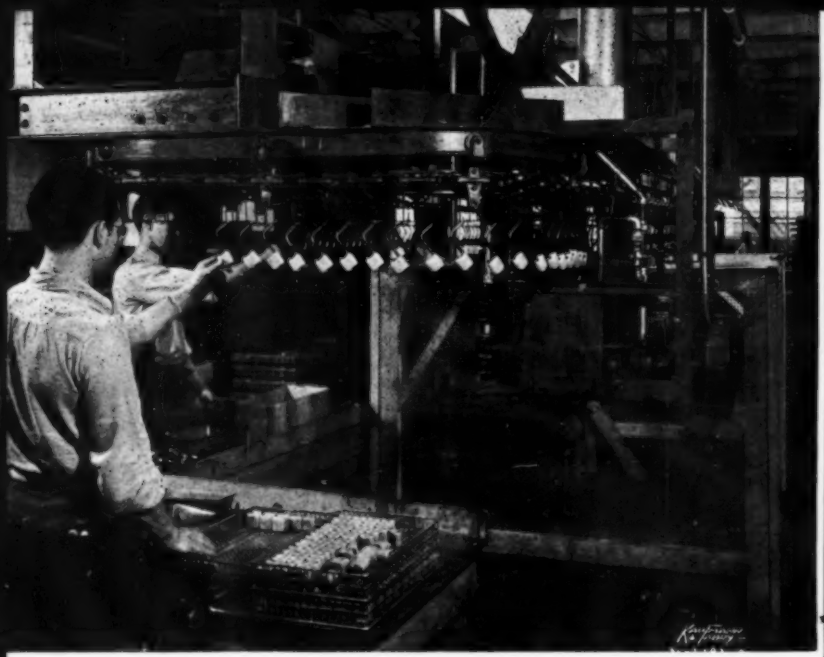
CSC makes no lacquers or thinners but supplies solvents and plasticizers to manufacturers of protective coatings.

CSC

COMMERCIAL SOLVENTS

Corporation

17 East 42nd Street, New York 17, N. Y.



Flow Coating Padlocks

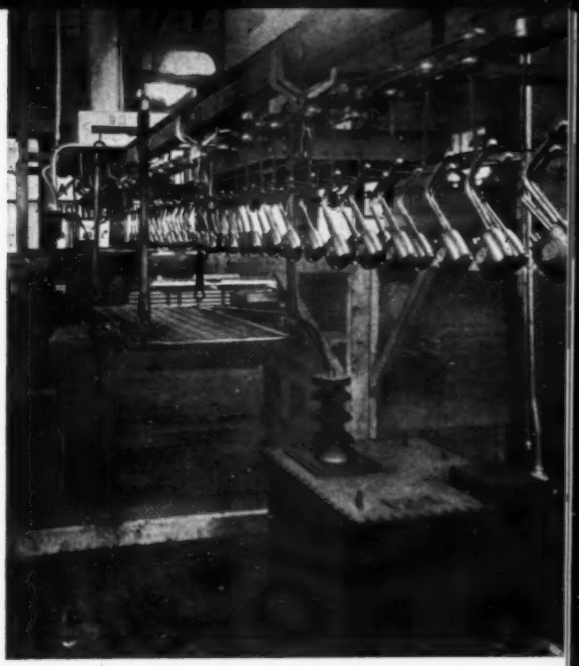
WHEN our client, Mr. R. K. Gray, President of the Illinois Lock Co., decided to market a completely new padlock, we were asked to work out the coating problem.

The production is planned at 20 locks per minute. The lock is an ordinary shaped padlock made of a zinc die-casting. It has a superior type mechanism which requires close tolerance.

Problems Involved in Our Padlock Painting Job

The finish cost had to be low, the floor space limited, the quality above competition, and no scarce materials used. Many samples of pigmented materials were tried. While the finishes were beautiful, they did not give the added impression of strength. Finally a sample of a bluish-cast gun-metal air-dry lacquer was obtained. The material has a desirable luster and the aluminum pigments do justice to the product by bringing out the durable quality.

The factory is located on a boulevard in a congested area. A spray exhaust stack would cause unpleasant reactions from the neighbors. Skilled spray operators would be hard to obtain. The shape of the item would require a very wasteful gun setting on an automatic spray machine. The spindles and spin-



On this page: View at right shows padlocks hanging from a conveyor, moving toward observer. They have passed through the flow-coating, draining and electrostatic detearing zone.

Opposite page: One operator is loading conveyor which is moving from his left to his right. At right (after the conveyor makes its turn) the padlocks are entering the flow-coating zone. Workman at left, in background, is removing finished padlocks from the overhead conveyor.

in Electrostatic Zone

BY BYRON MORRILL
Morrill & Renshaw
Finishing Engineers

ning mechanism would be expensive if the machine were to be made long enough for drying time. A wet transfer point would mean additional labor which is difficult to obtain.

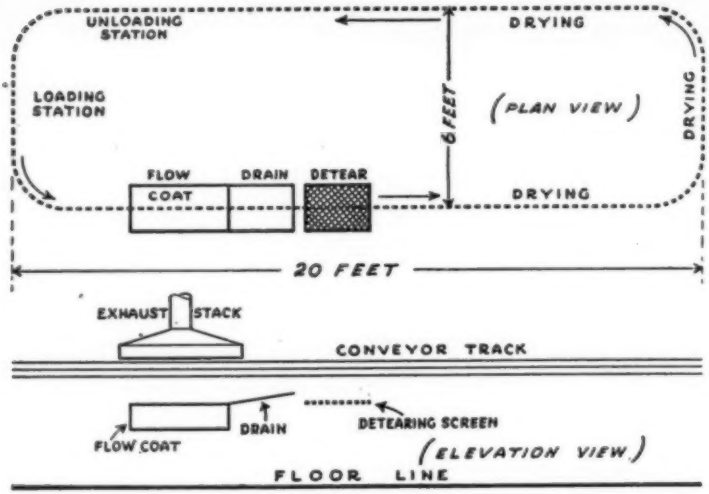
If the locks were dipped, a very careful masking operation would be required. Coating material must not be allowed to enter the mechanism through the shackle holes, the vent, or key hole.

Flow coating, plus electrostatic detearing* appeared to be the lowest cost method. A 6-gallon tank with a ¼-hp. pump permits a comparatively small amount of lacquer in use and keeps the metallic pigment in suspension.

*Removal of "tear drop" of excess paint or lacquer that clings to low edge of dipped or flow-coated items.

Conveyor and Work Holders

An ordinary monorail conveyor 50-ft. long, suspended from the ceiling, allows 15 minutes drying time. The floor space is saved for other uses, except that space occupied by the two operators, the material tank, and the electrostatic



Plan and side elevation views of conveyorized flow-coating, draining, electrostatic detearing and air-drying set-up for lacquering new padlocks.

detearing unit. Double hooks (inverted T's) were placed on 4-in. centers.

The workholders were made of steel rods with tapered ends. These rods were bent to a 90° angle for ease of handling and to carry the work at the best flowing position. They are notched to form a strong clasp when they are hung to the conveyor hooks. The tapered end of the rod is inserted in the shackle hole of the lock and is held tightly by friction. This also serves as a mask to prevent lacquer from entering the lock mechanism. It is not necessary to mask the key hole cavity because the lock is carried with this part in "down" position, and slightly tilted. The coating material flows around but does not enter the hole.

Two locks pass through the flow coat simultaneously. There is a single stream of material flowing over each one. They continue over a drain pan for one minute and then pass over the electrostatic detearing grid for a minute. By this time, the lacquer is pretty well set up. They continue around the loop of the monorail conveyor for approximately 15 minutes, returning to the operators dry.

A small ventilating blower is arranged to exhaust the evaporated thinner. Practically all of the material is used. The only loss is the drop of excess lacquer which is removed by the electrostatic detearing outfit. Without this operation, an ugly spot would appear at the drain point of each lock.

When the machine is operating at capacity, only two unskilled operators are required. Each one puts on and takes off ten locks a minute. The conveyor is equipped with a variable-speed drive.

These padlocks are brought to

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fungus resistant

No. 5531 meets all the requirements of the Signal Corps tentative specification 71-2202-A. The most important of these requirements are:

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MURPHY VARNISH COMPANY
NEWARK SAN FRANCISCO CHICAGO

MURPHY *Protective* COATINGS

and taken away from this flow-coating set-up in baskets on roller conveyors. The design of the machine will permit the addition of baking equipment in the event that a baked finish becomes possible, desirable or necessary.

The locks receive a cronak treatment before coating to avoid inside corrosion. The result is not only a fine quality product but one with an outstanding eye appeal at a very low coating cost.

Luminescent Pigments

LUMINESCENCE, as the term is generally defined, is the ability of a substance (natural or processed) to absorb radiant invisible energy and, after converting it to a longer wave length, to emit the energy as visible light. The radiant energy is provided by the activation of a light source in the short wave length visible, or the near ultraviolet* spectral range. It is then converted and re-emitted over the visible range. There are two types of luminescent pigments: 1) fluorescent, and 2) phosphorescent.

Fluorescent pigments include all those that emit radiant visible energy only during the time of activation**. These materials have no useful afterglow. The most useful fluorescent pigments now available are zinc sulfides, and combinations of zinc and cadmium sulfides.

Fluorescent pigments are similar to ordinary pigments in their particle size structure. The fluorescent colors include various yellows, green, blue, red, orange and orange-yellow. The yellows and green have the brightest fluorescent intensity.

Phosphorescent Pigments

Unlike the fluorescent pigments, phosphorescent pigments emit visible radiant energy for varying periods after activation ceases. Consequently these pigments have useful afterglow lasting for a period varying from a few minutes to several hours. It is probable that the phosphorescent pigments offer the greatest potential for postwar luminescent applications, since they are activated by either visible or ultraviolet light and they have useful afterglow characteristics.

The phosphorescent pigments most generally employed at the present time are crystalline forms of zinc, cadmium, calcium and strontium sulphides. Varying combinations of zinc and cadmium sulfides, and of calcium and strontium sulfides, often are used. Phosphorescent pigments are coarse in texture and cannot be subjected to extensive grinding. Any severe mechanical work done on the pigments causes a loss in the phosphorescent characteristics.

Activating Light Sources

A suitable light source is required for the proper use of luminescent pigmented products. Generally the fluorescent pigments need an ultraviolet, or so-called "black" light, which, with suitable nickel oxide filters, excludes most of the visible light. High pressure mercury arc lamps, argon glow lamps and fluorescent lamps are generally used though an ordinary tungsten filament lamp equipped with a proper nickel oxide glass filter is a satisfactory light source.

(Continued on page 42)

*Ultraviolet end of the spectrum outside visible light range. Near ultraviolet contains some visible light.

**Activation is the process of absorbing radiant energy from a light source of short wave length and converting such energy into visible light.

ZAPON

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Protective qualities and durability have too often dominated the finish job. In *Zapon Metalites*, however, appearance is emphasized, as well — to fill an essential need by giving products the high degree of attractiveness that is measured in terms of sales appeal.

WHAT ARE ZAPON METALITES?

Metalites are metallescent pigmented coatings, formulated on a number of different bases. They serve to brighten and pick up colors; to bring them *alive* with new sparkle and lustre! There are almost endless possibilities *now* for endowing metal products with new appeal, durability, protection and economy through use of Metalite finishes. For example, even the conventional Filing Case Green is more striking, more attractive, when the finish is a glistening Metalite. For Metalites blend harmoniously with formerly-used colors, yet impart an added eye-catching lift!

CAN YOU GET METALITES TODAY?

Yes, subject to certain wartime restrictions. For instance, those Metalites which are formulated from oleaginous resinous (varnish) bases are largely available today, and many lacquer enamel base Metalites are also generally obtainable. The high-bake Duranite and Alkyd enamel Metalites, of course, are more closely restricted, depending on the essential nature of the end products.

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The Chris-Craft Corporation gains speed in constructing wooden landing boats by spraying the tough marine finish required. At the left a "Chris-Crafter" is shown spraying watertight adhesives on the hull before canvasing.

In the lower left view you see how the precision workmanship in aircraft parts is protected with DeVilbiss Spray Equipment at the Bendix-Westinghouse Automotive Air Brake Company.

The modern DeVilbiss Spray Systems that aid in producing and protecting the quality of these war products will mean important advantages for peacetime products, too . . . because DeVilbiss' outstanding design and engineering simplify their conversion to peacetime use.

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Cleaning, Surface Treating and Protectively Coating That New, Lightest Metal

Magnesium

BY G. C. CLOSE

FOR every pound of magnesium produced in 1939, 100-lbs. are being produced today. Additional magnesium production facilities are under construction, and more are being planned. The supply of magnesium is limited only by man's ability to dig it from the earth, or extract it from the sea. Magnesium is the lightest metal known, has a strength-weight ratio greater than the toughest steels, machines more easily than any alloy yet developed, and its present price compares favorably with all materials with which it has to compete.

The above substantial facts should flash a red-light warning to the industrial finishing industry. Finishers who have never handled this material previously will find themselves coping with many magnesium products soon after the war.

The author has had the privilege of either conducting or witnessing many investigations relative to protection from corrosion of the magnesium alloys. He has noted the growth of magnesium from a laboratory toy to a substantial factor in the aircraft industry. The average foreman-finisher is not interested in experimental data as it applies to his work. He is more interested in the down-to-earth facts concerning proven methods that will assure best results. Therefore, in this article, only those methods of protecting magnesium that have proved entirely effective will be covered.

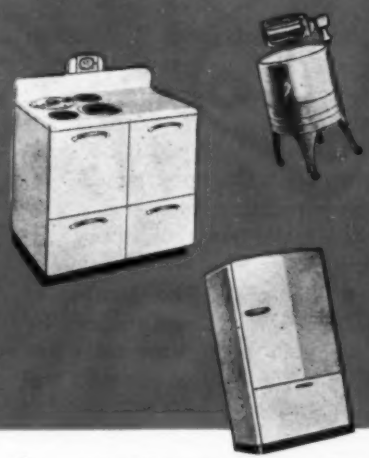
Accurate Information Has Replaced Unfair Tests and Prejudice

For many years magnesium bore the unfortunate reputation of a metal that was too corrosive for practical industrial use. This misconception was an idea fostered by the common metallurgical practice of rating the corrosion resistance of all metals and alloys by their resistance to salt spray attack. It was haphazardly overlooked that a huge majority of industrial applications would in

---

I hope you like this article. I have tried to slant it for the average foreman finisher who is mainly interested in the best available methods of treating magnesium. I have eliminated, to a large extent, the theoretical data that so often confuses an article of this type. Each of the surface-treating methods described here has proved its value, when properly applied and used under conditions for which it is recommended.—The Author.

JOHNSON'S WAX-O-NAMEL for Household Equipment



Tomorrow's refrigerators, stoves, washing machines and other home equipment will stay new looking longer, and be easier to clean, if finished with Johnson's Wax-O-Namel, the enamel that contains wax.

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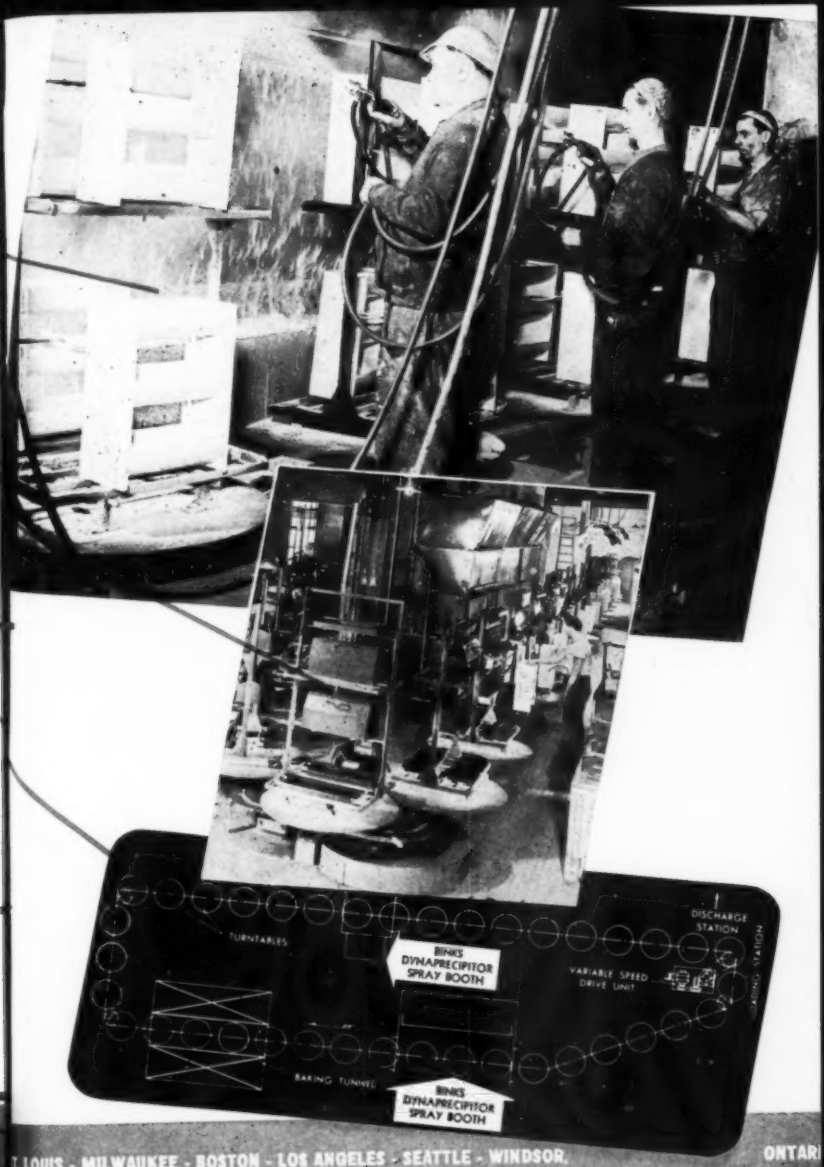

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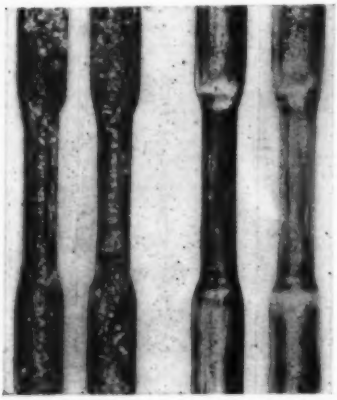
r complete information about Binks Spray Painting Systems. No obligatio



Test bars at left were exposed 24 hours in a salt spray cabinet; test bars on right were exposed 6 months in coastal atmosphere. This indicates conclusively that salt spray testing is not always a true criterion of resistance to corrosion during service.

no way subject the material involved to saline or sea atmosphere conditions.

Later developments have discounted a great deal of the theoretical information gained by salt spray testing. A cumulative fund of knowledge indicates conclusively that under ordinary conditions, where salt atmosphere is not present, untreated magnesium is more highly resistant to weather corrosion than wrought iron or steel. After 15 years of constant exposure near the shore of Lake Michigan, untreated magnesium panels exhibit only a hard black oxide shell. Steel panels exposed concurrently are in an advanced stage of deterioration from oxidation and rust.

Wider application of the magnesium alloys naturally spurred research in the development of improved methods of protective treatment. Today there exists a variety of surface treatments and finish coating specifications that will effectively protect the metal under both ordinary and sea atmosphere conditions.

Prior to delving into the actual mechanics of the surface protection of the magnesium alloys, it will not be amiss to discuss briefly certain corrosion characteristics as they affect the usefulness and service life of the protective coating applied.

Magnesium's Corrosion Characteristics

Magnesium and aluminum rank in the order given near the top of the electro-potential series of metals. Because of this fact, the initial corrosion of both metals is strikingly similar. Either will oxidize rapidly when exposed to air, and both are quickly coated by a thin oxide film.

The oxide formed on aluminum is hard and homogeneous and successfully resists further corrosive attack. The oxide film formed on magnesium, however, is of a less durable character, and time is required for it to attain an impervious and resistant character. When severely corrosive conditions are present, the deterioration of the metal is so rapid that the oxide film has no chance to age and attain an impervious condition. Under neutral conditions the film will form and cure before the base metal is substantially attacked. This fact explains why untreated magnesium will deteriorate rapidly in coastal and certain industrial regions, while a similar piece of metal exposed to normal atmosphere will remain uncorroded for years.

The fact that the magnesium alloys deteriorate rapidly under certain conditions, yet exhibit good

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corrosion resistance under others, indicates conclusively that they are partial to the medium or locality of their use. More specifically, before any type of protective treatment is applied to magnesium, it should be ascertained to just what corrosive conditions the metal will be exposed during service life.

Much has been accomplished in determining the resistance of magnesium to specific elements, compounds, and materials. A general compilation of data indicates that the alloys are effectively resistant to attack by the alklis, and to many organic chemicals in the form of aldehydes, hydrocarbons, acetones, phenols, amines, esters, the alcohols (except methyl alcohol), and the chlorine-free oils.

On the other hand the magnesium alloys are readily attacked by all common acids except two. The exceptions in this case are pure chromic and concentrated hydrofluoric acid. Aqueous salt solutions, except those of the alkali metal arsenates, chromates, dichromates, and fluorides, will deteriorate magnesium. The salts of the heavy metals, and especially the chloride salts, are extremely destructive to all magnesium alloys.

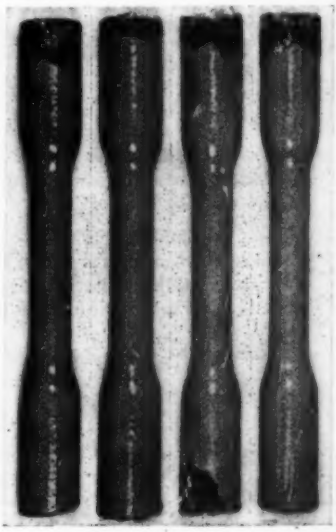
An examination of the service conditions to which magnesium will be subjected in conjunction with the foregoing information will indicate immediately to what extent surface preparation and protection must be carried out.

Another and a very important factor relative to the corrosion characteristics of magnesium will be brought up at this time. This is the tendency of the metal to form initial focal points of corrosion rather than to suffer a general surface breakdown. Because of this characteristic, the homogeneity of any surface protective coating applied becomes of paramount importance.

Start of Breakdown Signals Progressive Attack

A single break or pinhole in the surface coating will permit this focal point of attack to be established. Thereafter corrosion will be progressive, eating its way back under the coating, and causing general blistering and breakdown of the entire finish system. Under adverse conditions, such progressive corrosion will continue until the part involved becomes unfit for further use.

The most successful way of eliminating the possibility of any surface breaks or pin holes in a



Sharp radii should be eliminated whenever possible. Note that the above magnesium test bars have suffered corrosive breakdown along the radii formed by the end and sidewall of the test bar, in each instance.

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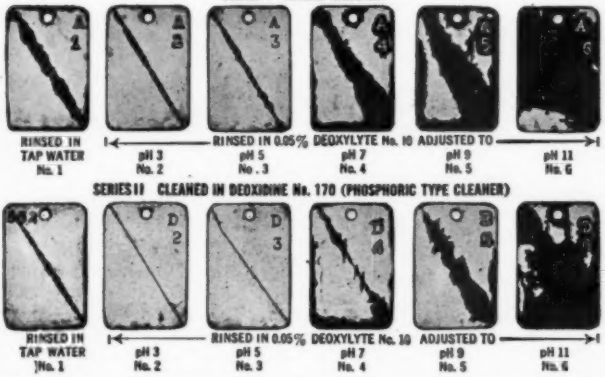
THE FINAL RINSE

A VITAL STEP IN METAL CLEANING

Effect of Various Rinsing Conditions


SERIES I ALKALI CLEANED
RINSED IN TAP WATER No. 1
RINSED IN 0.05% DEOXYLYTE No. 10 ADJUSTED TO
pH 3 No. 2
pH 5 No. 3
pH 7 No. 4
pH 9 No. 5
pH 11 No. 6
SERIES II CLEANED IN DEOXIDINE No. 170 (PHOSPHORIC TYPE CLEANER)
RINSED IN TAP WATER No. 1
RINSED IN 0.05% DEOXYLYTE No. 10 ADJUSTED TO
pH 3 No. 2
pH 5 No. 3
pH 7 No. 4
pH 9 No. 5
pH 11 No. 6

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Deoxidine not only removes rust and oil, also visible and invisible rusters from the metal surface, but as shown above, *Deoxidine* cleaned surfaces are much less sensitive than alkali cleaned surfaces to the nature of the final rinse.

A comparison of the corresponding panels of Series I (Alkali Cleaned) with Series II (Deoxidine Cleaned), which were exposed to salt spray, shows that scratch failure is much less in the latter series.

The comparison also illustrates a point often overlooked that defective paint adhesion occurs if the final rinse is alkaline. Even tap water rinsing is objectionable due to the traces of alkali naturally present.

Comparison of Series I and II of the above chart shows the advantage of the *Deoxylyte* treated rinse over the tap water rinse (No. 1 in each series) regardless of type of cleaner used.

The most satisfactory results are obtained in a final hot rinse where a pH of 3 to 5 is maintained with the proper grade of *Deoxylyte*.

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B-7

surface coating is to establish an adequate cleaning system and to maintain rigid control over the solutions employed in applying surface treatment. Another important factor is the elimination, where possible, of sharp radii on the parts being treated. Though sharp radii are not generally deterent to efficient surface treatment, the surface tension of subsequently applied organic films will tend to cause minute ruptures or pinholes along such areas.

Surface Cleaning Magnesium

As stated above, any surface treatment applied to the magnesium alloys must produce a homogeneous unbroken coating for optimum results. ***One important factor in attaining this goal is through cleanliness of all surfaces prior to any type of treatment.***

Both mechanical and chemical methods are employed to clean magnesium. As the mechanical cleaning cycle will remove an unpredeterminable amount of base metal, it is generally limited to rough unmachined surfaces, or parts where close tolerance is not a factor.

Mechanical cleaning methods include shotblasting, sandblasting, wire brushing, and hand sanding. Though they are efficient for removing scale and other heavy dirt deposits, such methods will leave imbedded in the surface of the metal minute impurities that will later be conducive to corrosion. Hence it is common practice to employ a pickling bath subsequent to mechanical cleaning to assure removal of such particles.

A nitric-sulphuric acid pickle of the following composition is commonly employed where removal of from .002 to .006-in. of base metal will not affect the part involved:

Conc. nitric acid (HNO_3).....8% by vol.
Conc. sulphuric acid (H_2SO_4)..2% by vol.
Water (chlorine-free).....90% by vol.

This bath is used at room temperature, and immersion time will vary between 10 and 15 seconds, depending upon the strength of the solution. Depletion of solution strength is indicated by reduced activity, and when more than 30 seconds are required to remove obstinate scale the bath should be renewed. Immersion should be followed instantly by a thorough cold water rinse and hot water dip to facilitate drying.

Sulphuric-Acid Pickling; Chromic-Acid Pickling

The straight sulphuric-acid pickle is often employed on sand-blasted sand castings just prior to surface treatment. This bath is composed as follows:

Conc. sulphuric acid (H_2SO_4).....4 oz.
Water to make.....1 gal.

The work is treated at room temperature, and immersion time varies between 30 and 90 seconds. When the cleaning interval exceeds the longer period mentioned, the solution should be replenished with acid, or preferably renewed. Work should be rinsed immediately after removal. The sulphuric pickle may leave a loose gray powder adhering to the surface of the treated parts, but this is not objectionable; it will be removed during subsequent surface treatment.

A non-etching solution, frequently employed with machined parts, is the chromic-acid pickle. This solution is composed of 24-oz. of pure chromic acid per gallon of water. If chemical analysis indicates a considerable chloride content in the water, a 0.01% solution of silver nitrate should be added as a neutralizer. The

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Photo courtesy of De Vilbiss

PERMITE Ready-Mixed Aluminum Paints AGAIN AVAILABLE!

Combat products can again be given the special protection against fumes, moisture, extremes of temperature which are afforded by Permite Aluminum Paints. Recently issued order by the WPB relaxes restrictions on the use of aluminum pigment. On orders carrying a rating of AA-5 or higher, aluminum paints may be supplied for a broad list of permitted uses.

Permite Aluminum Paint comes ready-mixed – ready to open and use. Ends all the bother and waste of mixing on the job. Remains in suspension, retains its color indefinitely when opened.

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The Permite Line of Industrial Finishes includes Permite Government Specification Paints for War Production Use.

PERMITE READY MIXED ALUMINUM PAINTS

chromic-acid pickle solution is used at 180°F., and immersion time is between one and five minutes, depending upon the amount of dirt to be removed. The work must be thoroughly rinsed immediately after removal from the solution.

Chemical Cleaning; 3-Cycle Process

The exact procedure for chemically cleaning magnesium alloys will depend upon the contaminants to be removed. In general, chemical cleaning comprises a 3-cycle process including precleaning, cleaning, and acid pickle. When the work is not excessively dirty the pre-cleaning treatment may be omitted, but when heavy coatings of grease, or mold lubricants such as cocoa butter are present, considerable time and effort may be conserved by including the precleaning cycle.

The two methods of precleaning most commonly employed are vapor degreasing and the use of an emulsifiable solvent. With either method great care must be exercised to prevent accumulations of fatty substances or grease deposits in the solution or equipment employed. When organic solvents are employed, it is good practice to provide a second and clean organic bath for a final rinse of the work prior to immersion in the alkaline cleaner.

Final cleaning of magnesium should include the use of either a strong alkaline solution or the electro-cleaning process. Since magnesium is resistant to attack by the alkalis, a strong alkaline cleaner of the type used for steel is recommended. Such a cleaner will not only produce superior results, but will materially shorten the time required to clean.

Alkaline Cleaner

A cheap and readily available alkaline cleaner of the type recommended is composed of the following:

Sodium carbonate (soda ash)....(oz.)	3
Sodium hydroxide	2
Soap	1
Water to make.....one gallon	

A commercial grade of chemicals is satisfactory. Immerse work completely in the boiling cleaner for 5 to 15 minutes. Agitation will speed cleaning. Upon removal, rinse the work immediately in hot water (140° to 180°F.). Final rinse should be in cold water to eliminate the tendency for carried-over solids to dry on the work and give it a whiskery appearance.

Electrolytic Bath

The electrolytic bath employed in the electro-cleaning of the magnesium alloys is made up as follows:

Trisodium phosphate .....(oz.)	4
Sodium carbonate (soda ash).....	4
Water to make .....one gallon	

The work is made the cathode, and temperatures near the boiling point give quickest results. The current density at 6 volts should be between 10 and 20 amperes per square foot of surface. As constant agitation of the solution is maintained by the rapid evolution of gas, a clean surface is usually obtained in from one to three minutes. Control of solution strength is best maintained by frequent chemical analysis.

Certain proprietary cleaners have been compounded specifically for magnesium. Such cleaners contain wetting agents and other special ingredients that appreciably improve cleaning technique. When the amount of magnesium to be cleaned is not extensive, the

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● The chemist knows that he can count on his scales to register accurately the weight of a deep breath. And the finishing superintendent similarly knows that he can count on Arco Finishes to meet his specifications and performance requirements. Specify ARCO and you can depend on quality.

Paints for Industry THE ARCO CO.
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extra cost of such commercially prepared cleaners may be well dissipated in the improved results obtained.

After the final cleaning and just prior to surface treatment, the magnesium alloys should be pickled to remove all traces of surface oxide. Pickling solutions recommended to succeed mechanical cleaning are satisfactory, and should be chosen with an eye to whether or not removal of a certain amount of base metal is permissible.

(To be continued)

Luminescent Pigments

(Continued from page 26)

War demands have brought out improved black lights in a wide range of style and price. When used only for their afterglow properties, phosphorescent pigments may be activated by an incandescent light bulb, a photoflood lamp or sunlight. If the fluorescent characteristics are to be utilized, a black light must be used.

Response to activation requires from a few seconds to a minute or more, depending upon the intensity of the light source and the type of phosphorescent material being activated. In general, the greater the lag period before decay of phosphorescence, the longer the time that is required for activation. In other words, the calcium and strontium sulfides require relatively much longer time of activation than do the zinc and cadmium sulfides.—*Excerpts from an article in Feb. 1944 issue of Modern Plastics, by V. A. Belcher of the New Jersey Zinc Co.*

Handling Large Sheet Stock

SHEET materials that have been finished and thoroughly dried, and subsequently stored in flat level piles, are difficult to handle when it is necessary to pick them up one at a time. Like any sheet metal materials, they are ruinous on fingernails, unless some sort of wedge-type of device is first run in between the sheets to give your fingers full purchase. But the use of such a device often results in marring the finish.

Probably the best way to lift these sheets one at a time is to use a vacuum-cup lifting tool, such as is so often used in the sheet-metal industries. These tools are fitted with handles and rubber vacuum cups. All you need to do is to press the device down on the top sheet and then lift.

As made by one firm, these lifters are provided with trigger-actuated valves, so that pressure on the trigger releases suction when the work and the lifter are to be separated. Consequently, they can be used both for stacking and unstacking. Two men, using these lifters, can readily handle reasonably large sheet stock.—C. C.

Sewall Paint & Varnish Co. Appointments

The appointment of Cecil H. Bathurst as sales manager and Weldon O. Yocum as advertising manager of the Sewall Paint & Varnish Co. is announced by Grover M. Hermann, president of the American-Marietta Co., which recently acquired the Kansas City concern.

Bathurst, who has been with another paint company for 14 years, will inaugurate a sales expansion program for Sewall.

Yocum, formerly advertising manager of a Chicago firm, will work with Bathurst in the preparation of a new merchandising-advertising program.

The Chronicle of the Corrugated Lining

Spinning the metal into proper shape for a spun alloy steel bottle which formed an essential part of a hydraulic operating system of war plants, resulted in small corrugations on the interior surface of the bottle. A rubber bag fitted inside this bottle. Inflated and deflated by air pressure, sometimes as high as 3000 lbs. per sq. inch, you can readily appreciate what the small corrugations did to the outer surface of the rubber bag. Our problem was to design a coating that would smooth out the corrugations and provide a slick, glass like interior surface against which the rubber bag could move. The coating had to be tough. It had to resist penetration of a hydraulic oil as well.

HORN produced, not only a material with sufficient filling qualities to form a level surface and at the same time provide the high gloss required for a low co-efficient of friction, but a special system for finishing as well.

Then followed exhaustive tests. Among these was one for adhesion and toughness of the film which we will briefly describe. Several of the alloy steel bottles were set up on a target range and 50 calibre machine gun bullets fired thru them. After this firing, the steel bottles were examined to see whether our product had split or cracked beyond the point of immediate contact of the bullet and also to see whether the film had been chipped off by the terrific impact of these bullets. Neither of the two failures had occurred!

Even when a piece of metal was separated by the bullets from the rest of the bottle it took with it its own protective coating in perfect condition. This system of coating is being used with uniform success in the lining of thousands and thousands of these alloy steel bottles.

HORN designed the finish and the method.

A. C. HORN COMPANY

PRODUCTS FINISHING DIVISION

LONG ISLAND CITY 1, NEW YORK

CHICAGO • HOUSTON • LOS ANGELES

War-Product-Painting Management

An improved wartime painting set-up gets out more work and does it faster on same floor space. Some facts about how it is accomplished are revealed in this letter to the Editor.

BY RED SPARKS

AS A RESULT of the war the paint-room or finishing foreman's job in war product factories has developed into something quite different from the usual set-up in peacetime. Formerly we were concerned about various paint jobs and finishes for commercial products—and, in a large measure, those finishes were developed from our own standpoint, compatible with trends. This kept us right up there in front all the time, watching and ready for anything new that developed. It gave us a good bit of leeway to do many things in the finishing game, so long as we hewed pretty close to the line of public demand. And occasionally we could develop something original that sold readily to the public.

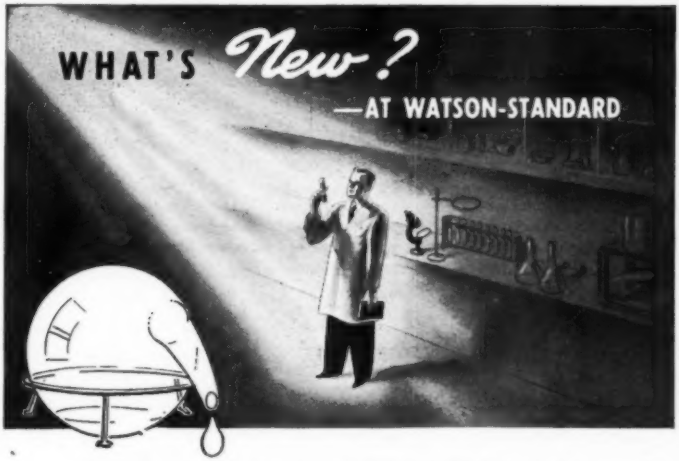
Now, however, we are not dealing with public demands—that is not from a commercial standpoint. All of us are engaged 100% in the manufacture of war products, and on this kind of a product the paint job or finish is specified. We have no other course but to follow specifications.

Paint Foreman Becomes Production Manager

Coupled with this is high pressure production. . . . The paint foreman has become a production manager, in his own department. It requires 90% of his time at that phase of his work alone. Management is the big thing now, as I see it. Of course, the application of the various paint jobs and finishes must be right, but the foreman of a well organized finishing department should have no trouble from that angle unless his skilled operators have been transferred to some other vital place, necessitating the teaching of new help. Granting that the old skilled workmen are still on the job, let's see what they are doing.

For one thing they are probably painting parts and products on a conveyor system, spraying continuously during the full work day. They maintain a schedule of continuous operation by substituting relief operators whenever necessary, which provides for no stoppage. When an operator steps away from his station on the line, a relief worker must be there to take his place. As in the tradition of the theater, "The show must go on," so in a war-product-painting department, "Production must go on."

Changes have occurred in other set-ups in the finishing department,



V-692 BLACK IS AGAIN AVAILABLE

A brilliant black for pharmaceutical and food packing. Will withstand acids and alkalis, also food acids and alcohol.

The efficient metal coating, developed in the Watson-Standard Laboratories, is a black that retains its brilliancy through all the abusive processes of fabrication including deep drawing and sterilization. It can be used directly on metal without sizing.

If you are designing a post-war product either of metal or other material we will be glad to develop a special prescription finish for it. Write us for detailed information.

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TOUGH JOB HEADQUARTERS
Rx Prescription Finishes
Give us your metal coating problem. We guarantee you an answer based on your conditions, and not just a standardized formula.

too. Formerly an article was placed in the spray booth, and the paint or finish was sprayed on; then the unit was removed and another one placed in position. Perhaps the spray booth was only large enough to take one unit at a time.

Now spray booths are different. They are constructed in various ways. Some of them are very large. Take, for instance, an assembled piece of ordnance—say a gun shield assembly that is too cumbersome to handle on a conveyor system—and large numbers of them are needed. One at a time is too slow. You have certain equipment and your customary floor space.

The gun shields are rolled into your painting department at the rate of 200 to 250 a day. You look at your War Manpower Commission Certificate, for which you have qualified by training. You have learned how to improve job methods; learned how to produce greater quantities of quality products in less time by making the best use of manpower, machines and materials now available.

Where the Saving Develops And More Speed Comes In

You break down the job of painting those gun shields, and instead of handling one at a time you handle ten. You do this by eliminating all false moves. You shorten distances. You cut out all unnecessary steps and motions—all that can possibly be done away with—and you can be assured that even the elimination of one movement, by a hand, counts up big in the long run.

By comparison, to spray one article your operator takes his spray gun off the hook at the side of the booth, sprays the article, hangs up the gun, removes the article, and arranges another one in position. Each unit requires taking the gun off the hook and hanging it up again when the article is finished.

All right! Now try ten of the pieces. By handling ten at a time you eliminate nine unhooking and nine hanging-ups of the gun. You eliminate about 65 steps, plus a certain amount of lost time because, each hanging and unhooking is conducive of waste time. Now the war production foreman is spending a lot of time breaking down these painting jobs. If he isn't doing this he is not on the job any more.

What I Mean by Speed

Now follow up this increased production with the necessity of handling it all in the same space that you formerly handled maybe one-tenth as much. You do it by fast movement of work through the department. Nothing stops. Everything must move and move fast. How fast? This will give you an idea:

Supt.: "Charlie, where is that shipment of armor plate you received this morning?"

Foreman: "What shipment, Sam?"

Supt.: "The one that was delivered to you about 9 o'clock this morning."

Foreman: "Oh, that. Why that's half way to Chicago already."

Now Charlie wasn't giving his superintendent just a line of talk. He was handing out correct information. Note the following typical schedule:

9 A. M.	200 pcs. armor plate rec'd.
10 A. M.	All painted.
11 A. M.	Weighed and marked.
1 P. M.	Boxed for shipment.
1:15 P. M.	Loaded on truck.

Frequently it happens that work received as late as 3 P. M. is cleaned, painted, weighed, banded,

The answer to

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may be in

OUR FILE

We invite you to submit your urgent or difficult finishing problems to our staff of experts for quick action.

RANDOLPH

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crated or boxed, billed out and actually shipped that day.

By this rapid and continuous movement of work through the painting room, you can see why and how production is increased without benefit of additional floor space. You don't keep any work in process in your department very long, therefore your working space does not become congested.

Ability to Manage Is What Gets You Ahead

If you recall any of my previous articles in this magazine you will remember that I have frequently stressed MANAGEMENT. Painting or finishing knowledge coupled with good management is a happy combination. A foreman who has both of these qualifications is very much in demand—and he is appreciated. However, there is this to be considered. A foreman with these qualifications will have added responsibilities thrust upon him. By reason of his ability he is noticed. He is a "doer" and being such, he finds himself accepting more duties, which he does cheerfully.

Personally, I now have charge of our finishing room, assembling room, carpenter shop, shipping department and one store room. So you see I am quite busy.

Finishing Foremanship

In 1916 I came to this company as a traffic man. After the first World War, I was "kicked" into the finishing room. I wasn't a finisher. Had absolutely no finishing background. I was an artist—landscape and portrait. The former finishing foreman got too old. Couldn't stand the pressure. No one in the finishing department would tackle the job. That's why I was "kicked" in.

Trouble developed in the assembly department and that was tacked on to my responsibilities. A short time later confusion occurred in the carpenter shop — boxing, crating, etc. Rather the confusion came to a head because the carpenter foreman was always in hot water with the office management. Both places were wrong. So that department was also tacked on to me. Then because the finishing, assembling, boxing and shipping were not coordinated by any one, that was added. And lastly there was so much bickering in the store room that I got that also.

I have had all of these departments since the Depression. There was a reason why those departments were given to me . . . . MANAGEMENT. But management can go wrong too. You can overmanage to your detriment. . . .

If You Can Manage You Can Get Things Done

A man can make a success of any kind of a department if he knows how to manage. On the other hand, he can have all kinds of technical skill and still be a failure as a department head, if he cannot manage. To know how to do a thing and still be unable to get it done—that is no good. You may not know just exactly how something should be done yourself; but if you are a good manager you will get it done, and you have accomplished something.

How often have you seen a good technician functioning as the head workman, with some other fellow in charge of the department? Plenty of times I suspect, and this goes right on up the line.

Your factory manager is there, not because he is the best mechanic, the best finisher, etc., but because he is the best manager. Of course,

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With the main source of chinawood oil in enemy hands, temporarily, our research laboratory has developed a good wrinkle finish without this critical material. Our laboratory has also developed another good wrinkle finish without the use of phthalic alkyd resin, as required by WPB order M-139, Direction 2, dated May 26, 1944, due to the country's shortage of phthalic anhydride. Both of these finishes have been highly satisfactory. Our Victory Wrinkle Finishes give results similar to our well known Duart Wrinkle Finishes and can be successfully used in production. Our experience proves that they provide a tough, durable finish of the desired pattern and cover surface imperfections in a single coat, using ordinary methods of application. Your inquiry is invited.
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the more technical knowledge he has, the better manager he is. He can get clear up to the top with a smattering of technical skill and a whole lot of managing skill; but he will never get to the top rung by reversing this.

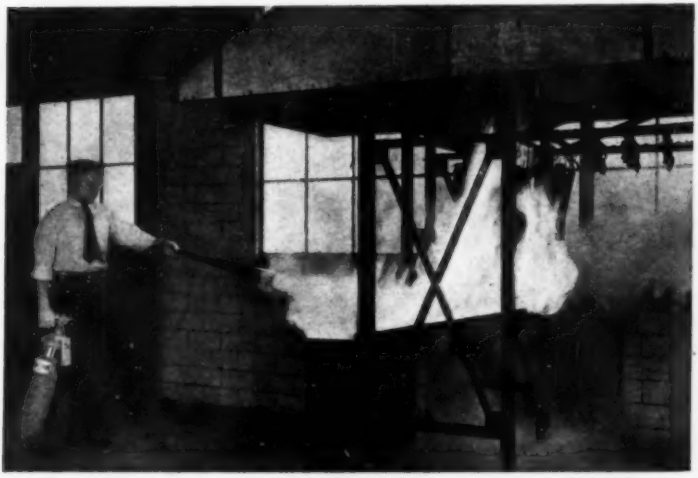
One of our greatest business managers was asked to what one thing he attributed his success. His answer was that he had sense enough to hire men to work for him who knew more about what they were doing than he did.

So management carries a good bit of weight with me; and right now it is standing me in good stead. There is one other trait that is fine to have—and that is the ability to relax. Don't take the shop home with you at night and keep yourself screwed up as tight as a fiddle string, so you cannot sleep, and have to go to work next morning only about 60% efficient. That way you burn up energy; can't build up any reserve force; get old too soon; and you are not worth a damn.

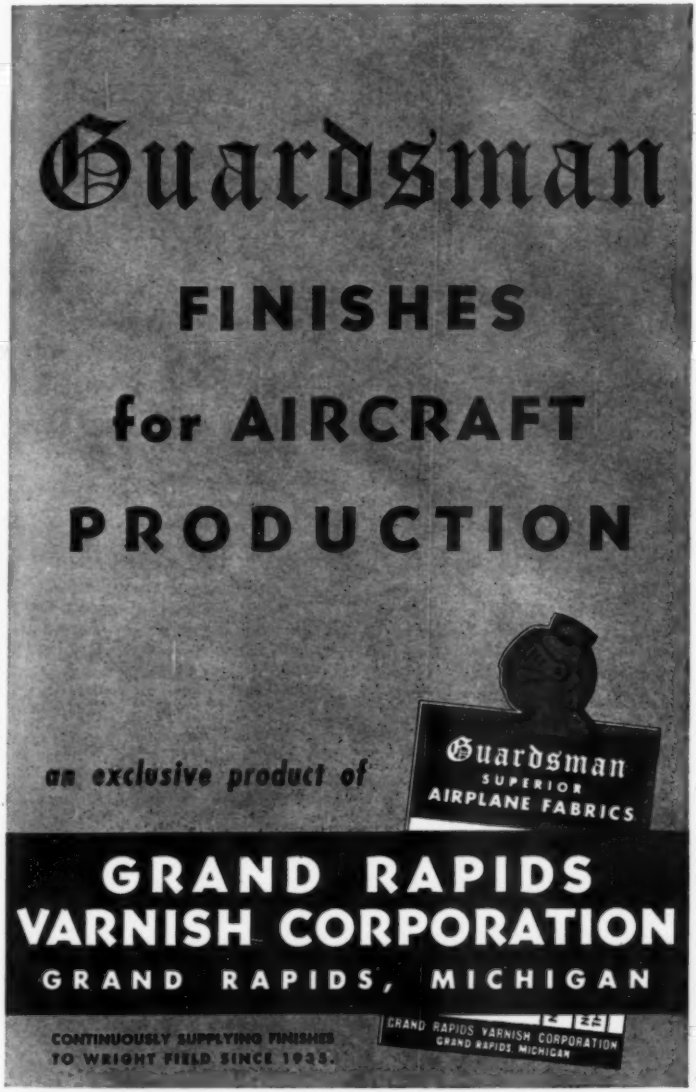
Getting Along With Your Workers

Tom Saffady of Sav-Way Industries, Detroit precision manufacturing concern, has written a little 16-page booklet "to production men who still like to get their hands dirty." In Saffady's distinctive dynamic style, this brochure presents a new slant on the well-worn philosophy that the folks in the "Middle of the Shop" represent a tremendously potent source of information and a fertile field for the development of labor-managment relationships which can have an important effect on production efficiency.

Saffady recommends that if management will take the trouble to get really acquainted with its workers, it will be surprised at the results. Send for a copy; it's free.



Putting out a fire that suddenly started at a dip tank and drain board under a conveyor. Demonstrator is using the new type carbon dioxide fire extinguisher equipped with "Squeeze Grip" valve. The discharged gas quickly smothers the fire. Photo, courtesy of C-O-Two Fire Equipment Co.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Zinc Surfaces Will Hold Paint If...

Detailed results of different treatments worked out to make paint adhere to various zinc coated surfaces; also to other metals. Tests included bending and real outside exposure for different periods of time.

BY H. E. VAN SICLEN
Western Electric Co.

ZINC AND ZINC-COATED surfaces have provided a serious problem in finishing, both for the paint specialists and the manufacturers of equipment, principally because of the rapid loss of adherence of organic finishes on zinc as compared to other metal surfaces. Typical examples of this early failure are not difficult to find throughout the various industries where zinc is necessary and economical to use.

Experience has shown that galvanized iron which has been painted and exposed will show cracking and peeling of the finish after short periods of service. Finished parts of equipment and apparatus manufactured from zinc, zinc alloys and zinc-coated metals have indicated insufficient adherence after several months in storage. In many instances the finish has retained good adherence for a reasonable period of time and then completely lost its adhesion.

Why Paint Doesn't Stick to Untreated Zinc

The explanation for this particular type of failure has been considered from many angles. Several theories which appear most reasonable are: 1) the zinc surface is too smooth, consequently offers poor adherence; 2) the presence of zinc destroys the normal orientation of the molecules of the finish toward the metal surfaces, resulting in lack of adherence; 3) the formation of a compound at the interface between the zinc and the organic finish which offers no great degree of adherence to either the zinc or the organic finish.

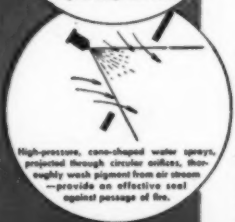
With reference to these theories, it was considered necessary only to roughen the zinc surface to improve the adherence of the finish. The age-old method of weathering, sand-blasting, etching with acids or acidulated solvents, is still used for this purpose today. However, the improvement made by the general methods of roughening the surface, in most cases, is not satisfactory.

Regarding the influence of zinc on the orientation of the molecule, it is claimed that the metal surface or the oxide film exerts a selective absorption on the individual constituents in the vehicle of a finishing material. Thus the most active constituents which will then be the most prominent at the metal-finish interface may give the weakest cohesive strength. Consequently a

3 OUTSTANDING ADVANTAGES of MAHON Hydro-Filter SPRAY BOOTHS

Adjustable reservoir construction of gutter above flood sheet insures an even flow of water over sheet, keeping entire surface clean.

Centrifugal eliminators separate all water from air stream. Clean air only is whirled upward to exhaust. Water drops to sludge tank below.



High-pressure, cone-shaped water sprays, projected through circular orifices, thoroughly wash pigment from air stream —provide an effective seal against passage of fire.

The Hydro-Filter principle gives to Mahon Hydro-Filter Spray Booths *three* outstanding advantages over conventional types of spray booth construction. *First:* When in operation, it is impossible for a fire generated inside the booth to pass the water sprays and spread through the exhaust system—or from the exhaust system into the booth. *Second:* Pigment, dust and other gummy substances, which normally build up in the exhaust ducts and fan, are removed before the exhausted air reaches this part of the system. *Third:* Water spray nozzles are out in the open in plain sight and are readily accessible. There are no concealed eliminators that require removal for cleaning. These are only highlights of many superior features of design and construction. Mahon engineers will give you the story in detail . . . will show you how Mahon Hydro-Filter Spray Booths are insuring firesafety, efficiency and economy in the spray painting of every conceivable product from small radio equipment to completely assembled bombers.

THE R. C. MAHON COMPANY

DETROIT 11 CHICAGO 4

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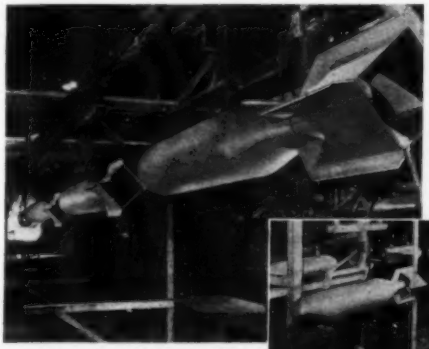
Photo-electric cells pull the trigger! Set up to help make *more* practice bombs and make 'em *faster* — the finishing system at Rheem Manufacturing Company is almost completely automatic. Photo-electric cells give the stop and go signals, control the paint spray guns. When bomb cases hit the light, they break the beam. *Automatically*, a battery of synchronized spray guns go into action! Paint used is a special Ammunition Finish made by Sherwin-Williams.

SHERWIN-WILLIAMS



INFRA-RED DRYING!
Powerful infra-red rays do the drying job at Rheem Manufacturing Co. In a matter of minutes, bomb cases come out of the oven baked to a hard, durable finish. Transported by overhead carriers, they stream to the identification station.

MECHANICAL MARKING!
Marking, too, is designed for speed. From the drying ovens, bombs move to this mechanical stencilling table. In a jiffy they get their identification data. Type, weight, and serial number are "rolled" on — with Sherwin-Williams Stencil White.

Rheem Mfg. Co., Speeds Practice Bomb Finishing with SHERWIN-WILLIAMS *High-Production Finishes!*

HIGH SPEED AT LOW COST is the rule for making practice bombs! The automatic, highly-mechanized finishing system used by Rheem Manufacturing Company, at their Chicago Plant, scores on both counts. Rheem uses a special Sherwin-Williams Ammunition Finish geared to keep pace with Rheem's fast-moving production line. It's a quick drier—after a few minutes in the oven, bomb cases come out with a hard, durable finish. And, although low in cost, this bomb paint produces a uniform, precision finish that easily passes government test.

Ask us about finishes that can help you boost production. The Sherwin-Williams Co., Cleveland 1, O.

INDUSTRIAL FINISHES

decrease in the normal adherent properties of the finish is the result.

Formation of Compounds Between Zinc and Paint

To support the theory on the formation of compounds at the interface, it has been shown definitely that reactions can take place between the zinc surface and the constituents of a finish. The compounds formed by those reactions are actually present on the paint film and are often visible when the film is broken away from the metal. Zinc formate has been identified as one of the products and is probably one of the causes of finish failure on zinc surfaces.

These theories and the research thus far conducted in this field indicate that the most essential feature is the condition of the zinc surface at the interface and its relation to the specific finishing material applied. The surface should be of a stable nature which is non-reactive to either the zinc or the organic finish, as well as being physically suited for providing the best adherence of the applied finish. The most logical and practical means of providing a good surface would appear to be to treat the zinc surface by immersing it in a chemical solution which would react with the zinc or zinc coating to form a complete, non-porous and stable compound suitable for the application of organic finishes.

Preparation of Zinc Surface for Painting

To prepare for this special surface condition at the interface, it is first necessary to properly prepare the articles of manufacture prior to immersion treatment. To insure satisfactory action of chemical treatment, all zinc parts must be thoroughly cleaned of grease and dirt. Equal parts of solvent naphtha and acetone have proved satisfactory for this purpose. However, methods in commercial practice, such as wash treatments, acid dips, electrolytic cleaning and vapor degreasing, are also suitable for the purpose.

The immersion treatment should be applied to zinc surface as soon as possible after cleaning to avoid any contamination of oxidation of the surface. The period of immersion will depend upon the chemical solution and the physical structure of the zinc surface. It is important that a complete and uniform coating result from the reaction. The presence of grease or any other foreign matter will be shown up clearly by variation in the coloring on the converted zinc surface or by the presence of bare areas which are not acted upon in the treatment.

Many treatments have been applied to zinc coatings from time to time to improve the adherence of subsequently applied organic finishes without much success. However, due to constant research, commercial materials are now available which give good results.

Different Treatment Needed for Different Zinc Surfaces

Unquestionably, a particular treatment will not give the same improvement in the adherence of a subsequently applied organic finish on all types of zinc surfaces such as galvanized iron, sheet zinc, electroplated zinc, etc. Nevertheless, it can be stated that the improvement in adherence on zinc surfaces prepared with certain treatments commercially available will be sufficient to effectively satisfy present commercial demands.

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Finishes are important in Planning Your

post war markets

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The transition to peace-time manufacture will require the same careful planning that was needed when industry converted to war production. That's why we invite you now to consult with us on your tomorrow's finishing problems.

Why not take advantage of the Reliance planning and engineering service which is at your command. There is no obligation involved! Write us. Reliance Varnish Co., Inc. Louisville 4, Ky. · Chicago 39, Ill.

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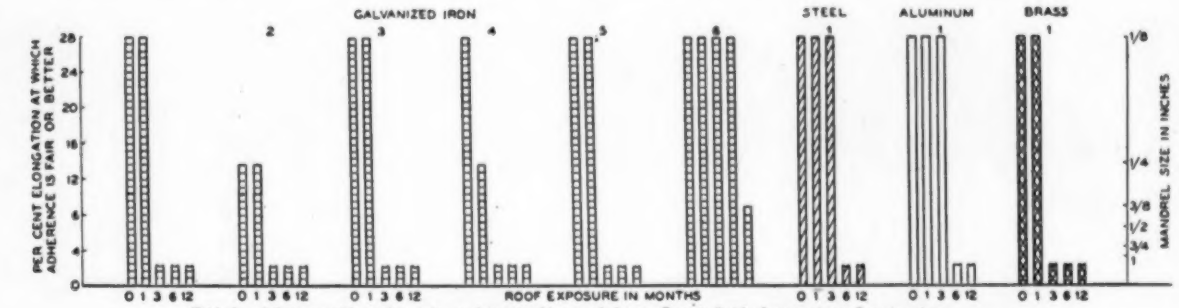

Table 1. Adherence with outdoor aging as determined by mandrel test. Organic finish: 1 coat primer, 2 coats paint.
Treatments: No. 1, cleaned. No. 2, copper sulphate immersion. No. 3, selenious acid immersion. No. 4, potassium permanganate-sodium hydroxide immersion. No. 5, copper sulphate-ammonium hydroxide-sodium cyanide immersion. No. 6, phosphate treatment.

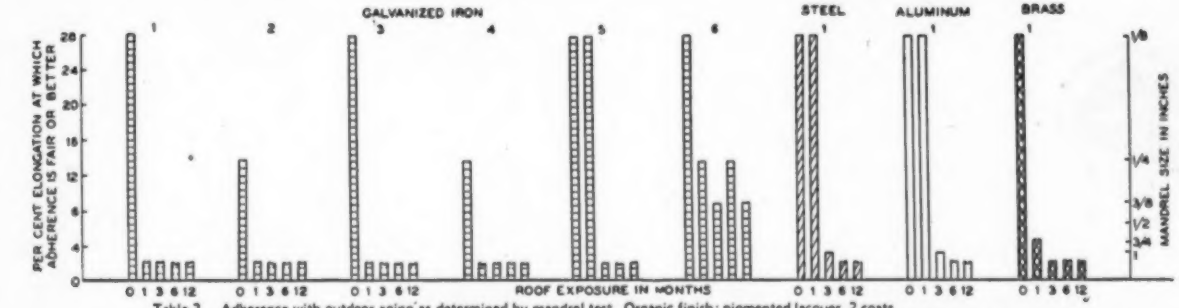

Table 2. Adherence with outdoor aging as determined by mandrel test. Organic finish: pigmented lacquer, 2 coats.
Treatments: No. 1, cleaned. No. 2, copper sulphate immersion. No. 3, selenious acid immersion. No. 4, potassium permanganate-sodium hydroxide immersion. No. 5, copper sulphate-ammonium hydroxide-sodium cyanide immersion. No. 6, phosphate treatment.

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- Colors . . . white and a wide variety of tints.

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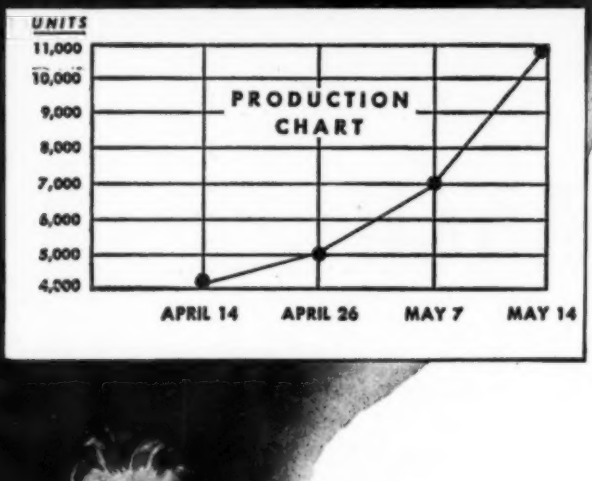

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The Du Po rvice M lem called fo jor ch system. Plan re prep Here is what recom

(1) A veyor
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(3) W -wash

Work was ed on t production n't stop the Du Pont 's assis was stepped rapidly April 14, to 00 on May 7 and 1 0—an

DU PONT

BETTER THINGS FOR BETT IVING

WRITE OR WIRE THE DU PONT WAR SERVICE MEN MA

☐ *How to speed output and save materials*

Handy pocket-size, fully illustrated booklet, *"Hints on Wartime Finishing Economies."* Shows you 11 points to check for greater efficiency and speed on your war contract finishing schedules.

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Check here for the help of Du War Service Men—skilled "tro shooters" to straighten out "ki in your finishing system *befo after* the trouble occurs. T "know how" is at your dispos any war contract finishing. W about your trouble. Or wi case of emergency.

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How a Du Pont War Service Man Helped a Plant More than Double Production in 30 Days

...ker of ...unition boxes had to double ...roducti...lmost overnight. He didn't ...he fini...fatilities nor the personnel ...et this ...gering increase. It sounded ...ssible, ...t something had to be done ...y! So h...lled on Du Pont for help.

...Du Po...rvice Man saw that this prob... ...alled fo...jor changes in the finishing ...n. Plans...re prepared for a new set-up. ...s what ...recommended:

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(3) W...-wash spray booths

...rk was ...ed on the new system. BUT—...ction d...n't stop in the meantime. With ...Pont...'s assistance, the daily output ...epped ...rapidly from 4,000 units on ...14, to ...00 on April 26, to 7,500 on ...and 1...0—an all-time peak—on May 14. When conversion was fully complete, production was then leveled off to a daily average of 8,000 units, adequate to meet the government schedule.

These installations, combined with the use of a new high-hiding finishing material, effected savings of more than 50% in finishing cost—savings that soon paid for the new equipment.

This entire case called for exceptional ability and knowledge of plant operation and finishing practices. In the course of boosting production while changing finishing systems, there were many difficulties that had to be overcome. It is an outstanding example of the experience and versatility of Du Pont men. Talk over *your* problems with the Du Pont representative near you. For his help write:

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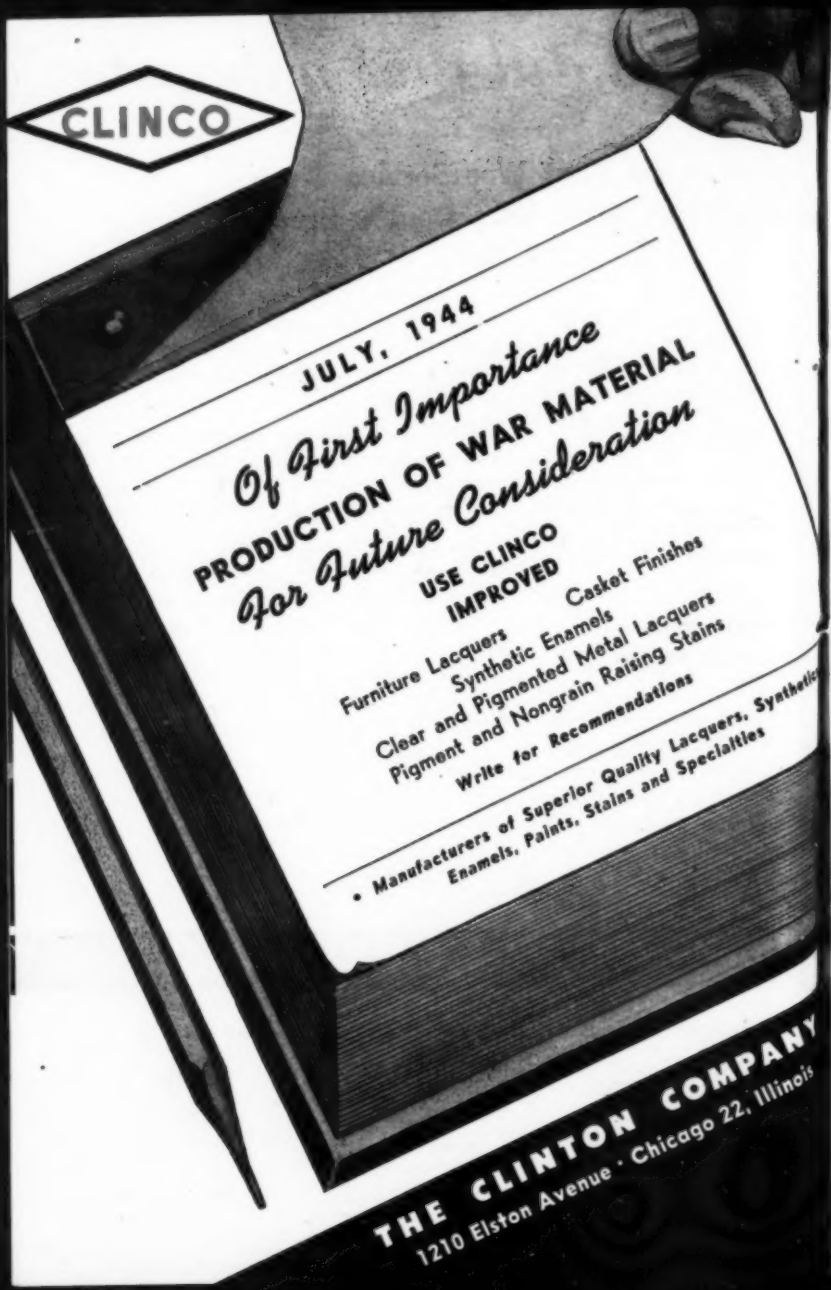
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ried results in adherence that may be obtained with various treatments, Tables I to III, which accompany this article, have been provided to show the retention in adherence of three different types of organic finishes, namely, paints, lacquers, and synthetic enamels when applied over a zinc surface (in this case galvanized iron) which has been treated with a number of immersion treatments. In addition to these tables there are presented, in Table IV, data which show the improvement in adherence of organic coating obtained by the use of a phosphate treatment on many types of zinc surfaces. The results of adhesion values of the same finishes applied to steel, aluminum, and brass have been included in each table for comparison with corresponding data on the various zinc surfaces.

Evaluating Adherence of Paint by Mandrel Test

As a method of evaluating the adherence of these finishes, a mandrel test was employed, as it provides a good indication of the adherence of a finish to its base surface. The mandrel diameters of this particular test range from ⅛ to 1-in. The degree of adherence is determined by scratching the finish on the bent area of the test strip with the finger nail. The percent elongation of the organic film that can be obtained by this test ranges from 3% to 28%. Failure to pass the test on the 1-in. mandrel (3% elongation) is indicated in the tables by a break in the segment representing the various finishes. Those which have an elongation of 28% (⅛-in. mandrel) have reached the mechanical limitation of the mandrel test. All test panels were subjected to outdoor exposure at 45° facing south, with additional periods of artificial rain. The finishes were tested at initial, 1, 3, 6, and 12 month aging periods.

Phosphate Treated Galvanized Iron

Phosphate treated galvanized iron offers an excellent surface for the adherence of paint (Table I). The phosphate treatment used is a commercially available process consisting of an immersion in a chemical solution which is maintained at an elevated temperature, followed by a cold and hot water rinse. The completion of the reaction is indicated by the discontinuation of gassing which, in general, occurs in less than one minute. The finishes applied over other treatments, such as the acid and the potassium permanganate-sodium hydroxide immersions, retained good adherence for a short period of time and then lost it almost entirely. This indicates experimentally the actual experience of manufacturers today when they use these or other similar unsatisfactory treatments.

The order of adherence of several finishes to phosphated zinc surfaces is evidently about the same as to cleaned steel. However, you should not be misled at this point into believing that the finish has flaked off or peeled when the table indicates an adherence which is unsatisfactory at the 1-in. mandrel. The fact is that the finish may still be intact on the surface, with the exception of cracking, but when tested it would show very poor adherence to the metal surface. This indicates a definite loss of adhesion, but not to such an extent as to cause appearance failure in service.

The same results as was shown with the paint are generally indi-

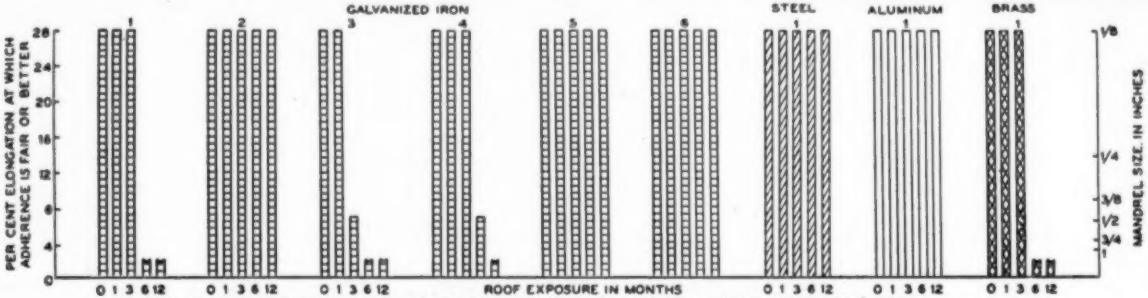


Table 3. Adherence with outdoor aging as determined by mandrel test. Organic finish: synthetic baking enamel, 2 coats.
Treatments: No. 1, cleaned. No. 2, copper sulphate immersion. No. 3, selenious acid immersion. No. 4, potassium permanganate-sodium hydroxide immersion. No. 5, copper sulphate-ammonium hydroxide-sodium cyanide immersion. No. 6, phosphate treatment.

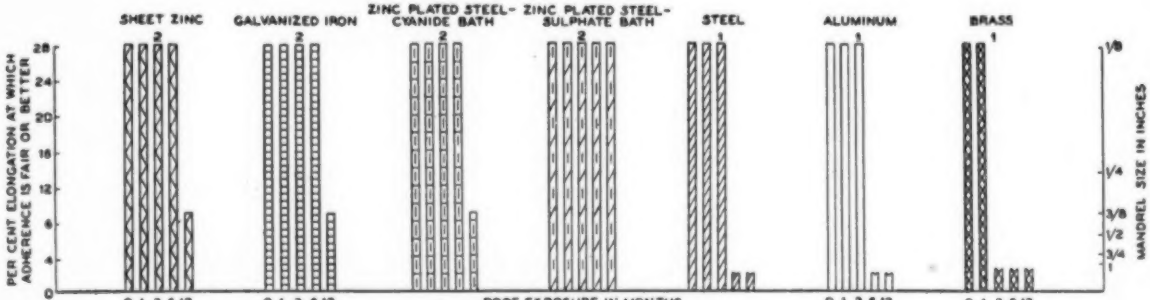
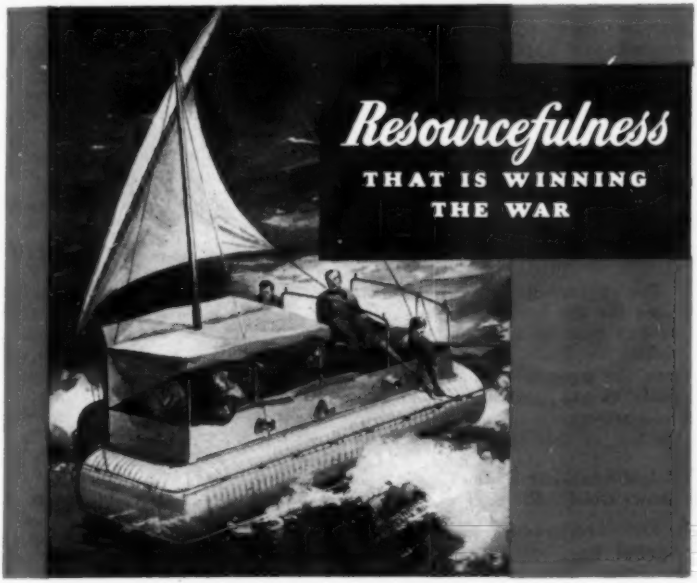


Table 4. Adherence with outdoor aging as determined by mandrel test. Organic finish: 1 coat primer, 2 coats paint.
Treatments: No. 1, cleaned. No. 2, phosphate treatment.



The Globe American Corporation of Kokomo, Indiana, is just one of many users of Berry Brothers' Industrial Finishes whose resourcefulness is helping to win the war. ¶ First it was life boats—even before stove production was suspended! In addition, now, it's 20-pass. all-metal life rafts that land on their feet like a cat, when catapulted overboard, complete with all equipment, including oars, mast, sail and canopy, even Bible, song book and chewing gum! ¶ Sturdily built to withstand a 45-foot drop test, these remarkable life rafts are mass-produced and painted on a 650-foot motorized production line. Production moves fast, so finishes have to dry fast. Rafts get a coat of Berry Brothers' No. 21 Zinc Chromate, followed 10 minutes later with a coat of Berry Brothers' No. 195 Low-Visibility Ocean Gray Paint. Finishing materials had to fit the production system, and Berry Brothers' Finishes fit it perfectly. And when stove time rolls around at Globe again, Berry Brothers' materials will offer the same production-proven advantages. ¶ What is your wartime or postwar finishing problem? Let us help you with it.

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cated when a typical pigmented lacquer and synthetic baking enamel are applied over treated and untreated metal surfaces, with the exception that the synthetic baking enamel appears to retain its adherence for a longer period (see Tables II and III). The retention in adherence of the baking enamel finish may be due to the greater cohesive forces that it possesses compared to that of other types of finishes.

The phosphate treatment provides for the best finish adherence on any type of zinc surface. The results in Table IV clearly indicate the progress which has been made in the length of time that good adherence can be retained by the use of this type of treatment.

Baked Synthetic Enamel Shows Good Adherence

For use over the phosphate treated zinc, and in general over any metal surface, the baked synthetic enamel finish is most desirable. It has been found by various investigators that the baking synthetic enamels, as a class, are probably superior in adherence to the other types of materials. In addition, a more wear resistant, tougher, flexible and weather-resistant coating is also obtainable as a result of the polymerization of the film by the heat applied in the baking operation. These properties, which this class of materials possess after baking, unquestionably increase the life of a finish on a properly prepared zinc surface. The results of a baking synthetic enamel on phosphate-treated zinc, as shown in Table III, affirms this fact.

However, for baked finishes on zinc alloys, it is suggested that the temperature of bake be limited to a maximum of 380°F., since any temperature above this limit will cause a change in the structure of the alloys, thereby changing the physical properties of the metal. Also, in the case of zinc die castings, excessive temperatures will cause pimpling and blistering of the surface due to entrapped gases.

In conclusion, I wish to emphasize the fact that the life of a finish depends primarily on two conditions when applied to products fabricated of zinc: 1) The proper preparation of the surface to insure the most satisfactory anchorage for the organic film, and 2) The use of finishing materials which are inherently flexible, adherent, and highly resistant to exposure.

Handling industrial liquids of any and all types is an interesting study. Some firms specialize directly on equipment for handling liquids. Included is equipment for proportioning systems for compounding and blending materials; this is highly accurate and positive. Other units, which are interesting from the manufacturing end of finish coatings, are automatic can-filling and barrel-filling devices. But equipment is also provided for the users of liquids. Combination storage and dispensing units for oils, paint oils and other liquids provide both cleanliness and safety.—L. D.

Strive to take better care of your spray-gun hose, to keep it serviceable for a longer time. Avoid dragging it over the floor, kinking it, hanging it over sharp edges or slender pins—and, above all, avoid leaving material or thinner in it when it isn't being used.

Concealed Beauty

Modesty in its place is all well and good . . . but if you have a new product to sell, don't conceal its beauty by covering it up with an unattractive finish.

Enhance your product's fine lines and material with a special finish designed for you by our Creative Studio. It will reveal to the fullest the outstanding qualities of your product. We invite reputable firms to use this service without cost or obligation.

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Your Paint Chemist

A paint chemist acknowledges that there can be differences between tests made in the lab. and on your production line—and reveals reasons why this often happens to be the case.

BY RAYMOND C. ADAMS

PROBABLY the essential difference between a successful and unsuccessful or mediocre paint chemist is his ability to develop a finish that will work on a production line as well as in the laboratory. This is a very difficult problem. Often it is impossible to duplicate plant procedure in the laboratory. The only answer is to actually make production runs.

I have often heard plant superintendents and finishing foremen make the following statement with regard to a chemist's opinion of their finishing problems. "I am not interested in the viewpoint of a chemist. I want the ideas of a practical man." Yes, how well I know this to be the case.

Paint Chemist Unwelcome in Some Factories

A few years ago a large manufacturer of radio cabinets was having considerable trouble with its finish. Our salesman, who wasn't selling any material to the company, jumped at the opportunity of taking me to the plant with the thought in mind of my solving the trouble and thus making it possible for us to get a chance at the business. We made the trip to the plant but before taking me inside

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H. Behlen & Bro., Inc., 10 Christopher St., N. Y. C. 14

he first wanted to go in and get permission from the superintendent for me to visit the finishing room.

The superintendent was (and for that matter still is) a very capable executive. Being in charge of such a large plant he was pestered daily with finishing salesmen and their technical men. He informed our salesman, in words not suitable for use here, that he didn't want any chemist in his plant.

A Different Technique Produced Results

That was the extent of my first visit. I didn't even get out of the car. We drove home that night (135 miles) but the salesman took me back the next day. This time he took me in the plant and introduced me to the superintendent as some flunky from the plant that he would like to show around. It turned out that I did see their trouble and worked out a finish that fitted their needs.

After the initial drum order we supplied them in truck load quantities. Many times after that I visited the plant and developed a close friendship with the superintendent and finishing foreman. It is doubtful if they ever knew I was a chemist.

In this instance it would have been impossible to have worked out the solution without having seen, with my own eyes, the conditions. It would have been impossible for the salesman to describe to me the condition so as to give me an exact picture of the trouble. As far as that goes I doubt that after I solved the problem if I could have explained to any other technical man the various factors clearly enough to be of value to him.

Paint is a very complicated mixture of ingredients and oftentimes you don't know why it acts in certain ways, but still you know that by making certain minor changes in the formulation, major accomplishments are performed. All of which leads me up to the statement that to be a good paint chemist you must have a good working knowledge of practical production finishing.

Laboratory Tests Versus Production Tests

In my opinion the testing of paint is divided into those tests that: 1) may be made in the laboratory, and 2) those that must be made in the plant. In the laboratory a chemist uses panels for his testing. These panels are usually less than one foot square. In spraying these panels a great deal of care is taken, much more than in production line finishing. Quite frequently, at least in my own case, a small suction type of spray gun is used. This is done in order that small quantities of material may be sprayed. In production finishing, the pressure-tank type of equipment is generally used, and there is no question that different results are obtained with such a wide variation in spray guns.

Naturally, in his laboratory the chemist is able to determine such factors as gloss, flexibility, viscosity and solids content, but such properties as sanding, rubbing and build, are best evaluated in the plant. As far as that goes, such properties as drying, adhesion and flow, although they can be evaluated in the laboratory, must be checked in the plant tests because frequently these properties are dependent upon how well the surface has been prepared. By this I mean instances such as the thoroughness with which a metal surface has been cleaned, whether

Design For Service To The Machine Tool Industry

(Beginning in 1929)

It is no accident that Lowe Brothers finishes have long been used by the majority of machine tool manufacturers. Here's the story!

Back in 1929, Lowe Brothers Finishing Experts went to The National Machine Tool Exhibition in Cleveland, to restore the finish on tools which were chipped or scarred in shipment. They have been doing it ever since!

In 1929, also, Lowe Brothers developed the standard machine tool color adopted by the Machine Tool Builders Association.

It was Lowe Brothers, too, who helped break the bottleneck in machine tool production caused by the slow-drying varnish type of finishes. Lowe Brothers were one of the first to develop a complete lacquer finish. It reduced application time by ⅔ by the spray method, cut drying time of each coat from overnight to 15 minutes, and provided a finish which holds up under constant action of cutting liquids.

Lowe Brothers finishes are the recognized standard of the machine tool industry. You can rely on Lowe Brothers broad experience with Government Specifications for machine tool finishes and industrial finishes of every type.

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IN ACCORDANCE WITH U.S. GOVERNMENT SPECIFICATIONS

undercoats have been applied properly, whether the filler or oil stain used on the wood has dried thoroughly, and many more.

In the laboratory greater care can be, and is taken, with the panel than can possibly be carried out on the production line. If a chemist does not realize this wide variation of laboratory and plant results he will often be misled in his opinion of his formulation. He might develop a finish which, according to his tests, is truly outstanding, yet the material might not gain the slightest recognition of merit after being tested on the production line.

Paint Chemist Should Visit Customers' Factories

Sometimes the paint chemist is egotistical and thinks he knows all the answers, and isn't open to suggestions from practical workmen whose opinion he doesn't respect. Naturally such a chemist only hurts himself. The best training I can possibly suggest for a paint chemist is to frequently visit the finishing rooms of the various industries in which his finishes are used. He should enter these finishing rooms with an open and observant mind. He should take the attitude that he doesn't know a thing about paint and is interested in learning as much as possible. He should not open his mouth to give advice, but only to ask questions, even the most ridiculously simple questions. If it is permitted, he should actually perform some of the various finishing operations himself.

If I were the owner or general manager of a paint company I would require each of my technical men to make a definite number of trips with the salesmen every year. After all, the finishes of any paint company are no better than the abilities of their technical staff. The technical staff might have the necessary "book-learning," but if the company is to progress, all research must be made with practical values in mind.

Coating and Drying Our Camouflage Netting

WHEN THE Government's requirements of camouflage netting for our expanding military operations were sharply increased a few months ago, the use of a modern continuous-drying system helped to solve the problems involved in fast production of huge quantities of this material, which is so vital in present-day warfare.

The nets, used for shrimp fishing in peacetime, are fabricated in knitting mills which normally produce lace curtains. They are made in sizes ranging from 22x22-ft. to 45x45-ft. From the knitting mills, the nets are turned over to floor covering plants and similar factories to be coated with the all-important compound that provides concealment not only from the naked eye but also from the penetrating lens of the infra-red camera. This coating compound, after it is thoroughly dry, is also fire-retardant and mildew retardant.

The process used in the floor covering plants is to run the nets through long tanks filled with the compound, which is agitated constantly.

At the floor plant of the Armstrong Cork Co., Lancaster, Penna., one of the nation's largest producers of concealment materials and other war products, several leading builders of processing machinery and equipment installed a modern continuous processing sys-

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tem for coating and drying these nets. Included in this new system is a drying oven 204-ft. in length.

The oven, constructed with modern insulated panels, was designed to handle 1000 nets measuring 45x45-ft. in 16 hours. Since the oven was built to take material up to 6-ft. in width, the nets were folded into eight layers for passing through the oven. A scientific arrangement of ducts, coupled with highly accurate temperature zone control, permits the introduction of large quantities of air which circulates in such a way as to insure uniform heating and proper disposition of solvent fumes throughout each heat zone. The heat zones total 200-ft. and occupy the entire length of the oven, except for the air seals at either end.

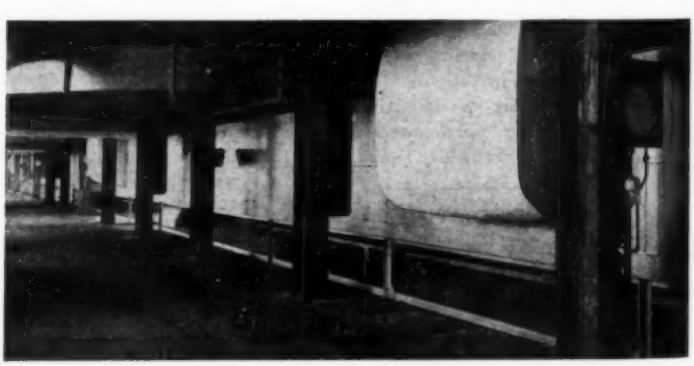
The complete system includes apparatus for coating the nets and for conveying the material through the oven. Based on tests which were made in the laboratory of the J. O. Ross Engineering Corp., the total time required to dry the nets with this drying oven is between three and four minutes.

The use of this new equipment eliminated the necessity of carrying large stocks of the nets in process, and it aided substantially in speeding deliveries to the U. S. Army.

Heat Resistant War-Product Finish

IN A variety of war products, wherein the metal surfaces are subjected to high heat and severe exposure tests, an inorganic, vitreous type of protective coating is being used. While this material has the low-temperature curing point of only 350°F., it has a resistance to heat up to 1000°F. Also, it has high resistance to corrosive influences, including salt spray; and a high resistance to abrasion. It is also a non-electrical conductor and may be used as insulation in radio and radar work.

An interesting heat-resisting application is in use at the Nashville plant of Consolidated Vultee Aircraft for flame-dampener assemblies of airplane engines. These assemblies consist of low alloy and



View of new net-drying oven, showing most of its 204-ft. length, air ducts and temperature recorders. Photo, courtesy of J. O. Ross Engineering Corporation.

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IT IS wisely said that "you can't put an old head on young shoulders."

Industry's recognition of the value of experience is evident in the service records of top-ranking personnel. A glance at those concerns which have weathered business depressions and wars shows the steadying influence of old heads—supported by loyal co-workers—on the destiny and functional operation of such industries. No momentary squall can rock the boat sufficiently to alarm these veterans into exercising snap judgment.

O'Brien's are proud of the veteranship of their organization as well as the veteranship of many of their products. Only three changes in sixty-nine years have occurred in O'Brien's presidency.

Inspection of O'Brien's wheelhorses today reveals the following degrees of veteranship:

President: 40 years of service; Secretary: 40 years; Sales Manager: 38 years; Credit Manager: 35 years; Purchasing Agent: 27 years; Production Superintendent: 25 years; Director of Research: 22 years.

There are many more positions held by veterans of proven supporting ability.

O'Brien's Liquid Velvet Flat Wall Finish enjoys a veteranship of thirty-one years as the leading finish in the field of interior wall decoration of American homes. Constant increase in sales volume is convincing proof of the wide acceptance of this product by thousands of users, notably master painters and decorators.

The first impression of quality in O'Brien's Liquid Velvet is gained the moment a brush is dipped into the product. Then, as Liquid Velvet is applied, the ease of application gratifies still further. Little effort is required to give proper, even distribution, and the finish works into lapping quite satisfactorily. Because the film sets quickly enough for any ordinary situation, a velvety sheen of just the right lustre develops to give the uniform, pleasing appearance which has delighted the discriminating housewives and decorators of America for more than a quarter of a century.

O'BRIEN VARNISH CO.
South Bend 21, Ind.

stainless steels. Here the technique is to spray, dry and bake the low alloy steel parts. The latter are then assembled with the stainless steel parts and the whole assembly is given a final spray and air drying. The unit is put in place on the engine when dry. This can be done without damage to the finish, which receives its baking from the heat of the engine during the test period. Experience has shown that this simplified procedure is satisfactory.

A recent trial on M. I. rifle gas cylinders included a shooting test of 200 rounds. The gun part reached a temperature of 900°F. but the finish was not affected.

As with all finish coatings, whether for protective or decorative purposes, or both, it is essential that the surfaces be carefully prepared and that the manufacturer's directions be closely followed in this respect. Otherwise the best results cannot be expected. This is especially true where the service conditions are extremely severe.

At the Rock Island Arsenal, Rock Island. Ill., a large plant is operated for overhauling gasoline engines for tanks, jeeps, trucks, etc. They are shipped in from all over the world. The exhaust manifolds of these engines are subject to extremely corrosive conditions. They are given a coating of this material as a part of the reconditioning process. The technique of applying this finish includes sandblasting to remove all traces of the old finish, and to give the surfaces a thorough cleaning. The coating material is then sprayed on and allowed to air dry. The manifold is bolted in place. The running of the engine on the test block provides sufficient heat for properly baking the finish. Obviously this high degree of simplicity of application reduces the problem of maintenance painting.

Numerous manufacturers of sheet metal products, such as field ranges, tent canopies, spark arrestors, etc., use this type of coating as it has been approved for these applications because of its resistance to corrosion due to exposure to the weather in all climates, salt water, etc.

In addition to the heat-resisting and other applications mentioned, the finish is being employed at the present time for radio and radar equipment installed on naval vessels; also for the drawers of steel cabinets kept on deck where they are subjected to salt water spray and bad weather conditions.—F. W.

Electrostatic Spraying

Fundamental advantage turned the porcelain enameling industry to the use of the spray gun. Its efficiency now promises to be increased through electrostatic spraying. This new equipment has been added at the plant of Pemco Corp., Baltimore, Md., so that its full possibilities can be investigated. The adaptation of enamels to this process is in line with the pioneering spirit that has guided the progress of Pemco for the past 33 years, according to a statement by the company.

Electrostatic spraying in the paint field is an already accomplished fact and there is no good reason why the same economy of effort—the same mechanical perfection and the same economy of operation cannot be secured in the field of porcelain enameling. Pemco believes it can, and has set out to prove this to be true.

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HARD . . .
MAR PROOF . . .

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A HIGH SPEED baking synthetic . . . resistant to grease, oil, alkali, alcohol and mild acids . . . Widely used on hospital furniture, Signal Corps apparatus, galley equipment, control instruments, etc.

Bakes in ten minutes at 300 degrees to a hard protective coating with great adhesion.

Full information and samples on request.

WRINK-ALL, a proven product, has all the characteristics of old type wrinkle in appearance, uniformity, application, baking schedules, etc. Available in all shades and colors.

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METALLIZED FINISHES
SYNTHETICS AND
SPECIAL COATINGS
FOR ALL SURFACES

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Rust Preventives—Oils

The Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y., announces a new line of rust preventive oils and fingerprint removers which will be marketed as the Ensis line. In four different types of products, the Shell Ensis line will be made available in 14 grades, covering a wide range of applications.

The protective coatings formed by Ensis rust preventives graduate from thin, transparent, oily films that need not be removed before use, to heavy, abrasion-resistant coatings able to withstand the damaging effects of moisture over extended periods of time.

One of the most important of the new products will dissolve fingerprints, displace water, and afford long-range protection against high humidity conditioning during storage. Another, a heavier, extremely powerful preservative, is designed for use on packaged precision parts or for unpacked equipment. All of the new preservatives are much easier of application and removal than the old-style semi-solid compounds, used for years in the packaging of rifles and arms parts.

Synthetic Sealing Tape

A newly developed Thiokol synthetic-rubber-base sealing tape is now solving one of the important problems in warplane manufacture and maintenance—sealing riveted fuselages, gasoline tanks, gun turrets and Plexiglas enclosure against leakage caused by the strain of power dives, tight rolls and other structure-torturing battle maneuvers.

Developed by the Presstite Engineering Co., St. Louis, Mo., this Thiokol-base tape is not soluble in most of the common solvents, including aromatic aviation fuel, ethyl and butyl acetate. Prolonged exposure to air does not harden the tape or change its consistency. It is, therefore, an excellent material for making fuselage seams raintight, leakproofing gasoline tanks and seaplane pontoons, as well as weather and pressure sealing cabins and turrets on high altitude bombers and fighters.

This Thiokol-base sealer is not only provided in tape form, in thickness of from .015-in. up to .125-in. but also in bulk form and in slugs of a size to fit the barrel of special high-pressure air guns for use in resealing integral fuel tanks in existing aircraft by the pressure injection method. This method has been successfully adopted by one of the largest aircraft manufacturers to seal the leading tanks in large transport planes when there is as much as 1800 gallons of gasoline in the tank.

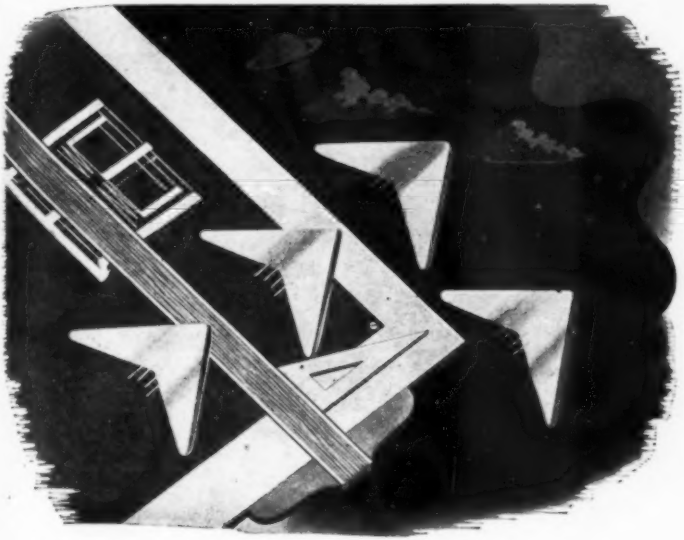
Presstite Synthetic Glass sealer, another variation of this versatile Thiokol-base material is used in large quantities by the U. S. Navy and many manufacturers to seal range-finders and other military optical equipment which must remain in perfect alignment despite severe shocks and strains.

"Iridite" for Zinc and Cadmium

Now protecting U. S. military equipment the world over, "Iridite," a recently developed anti-corrosive treatment for zinc or cadmium surfaces, vastly increases the field of usefulness of zinc and cadmium coatings.

Iridite, developed and manufactured by Rheem Research Products, Inc., Baltimore 2, Md., is used both as a

Materials Supplies Equipment



FRONTIERS OF THE NEW WORLD

We're in a new world . . . politically and industrially. War, with its veil of military secrecy, has made industrial transition . . . present and impending . . . particularly difficult to appreciate. But it is a fact.

For example: product finishing has seen the birth of new bases, new applications and new techniques so startling, so revolutionary, that no business can conceivably remain unaffected. Don't overlook this new world of chemistry in your post-war planning.

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Stanley Chemical

final finish and as a paint base. As a final finish it saves painting many parts of war equipment formerly required to be painted. With camouflage requirements in mind, Iridite has been developed in two natural colors: Army olive drab and a lusterless jet black. As a paint base, Iridite prevents zinc from "poisoning" the paint, and prevents the formation of any soapy, chalky underlayer that destroys adhesion.

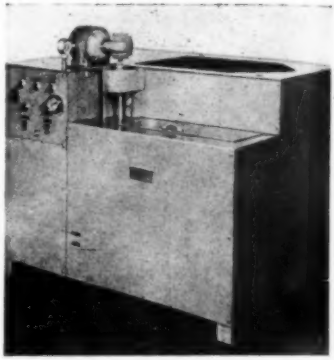
Iridite is applied by simple dipping. Times range from 10 to 60 seconds, and temperatures from 75° to 100°F. A brief rinse in hot water eliminates drying problems and completes the process. Parts may be handled or shipped as soon as they are dry. The protective solution does not alter dimensions or the texture of final finishes by more than a 3/100,000 of an inch, its developers assert. They also claim extreme flexibility. Parts treated with Iridite can be bent or twisted without chipping, flaking, or in any way affecting its corrosion-resistent qualities.

Ethyl Cellulose Melting and Dipping Tank

The Youngstown Miller Co., Sandusky, Ohio, has designed and built an ethyl cellulose melting and dipping tank that incorporates all the requirements set up by manufacturers and ordnance for control of this material.

The machine illustrated here is now in operation and is being used to dip spark plugs at the rate of 4500 plugs per hour. This is Model 60; it has a capacity for 100-lbs. of plastic per hour. Units are available with smaller capacities and in larger sizes, and with various dimensions of the dipping compartment.

Indirect heat is employed. Thermostatic control is maintained over both the heat exchange medium and the plastic to insure that neither rises over their maximum allowable temperature. The plastic is melted and preheated to proper temperature for dipping before entering the dip tank. Extremely close control and uniformity of temperature is achieved with remarkably low heating surface temperature.



Dip 4500 spark plugs per hour.

The plastic is circulated in such a way as to have constant level in the dipping tank and continual removal of the surface film that tends to form, and air bubbles which arise from the dipping of certain shapes. The units are complete, with all controls necessary to melt plastic and maintain it at the required dipping temperature.

Alkyl Aromatic Solvent for Metal Washing Machines

The Curran Corp., Dowling Bldg., Malden, Mass., manufacturer of Gunk self-emulsifying degreasing solvents announce a new alkyl aromatic solvent concentrate. The Development Chemist points out that the new solvent is non-inflammable and non-combustible, has no low volatiles, and forms sparkling clear solutions with water. The aqueous solutions are stated to be completely stable at elevated temperatures and have been conclusively demonstrated to inhibit rusting of parts cleaned. The cost of the alkyl aromatic solvent is said to be competitive in cost and is processed from non war-scarce chemicals.

Questions AND Answers

The finishing requirements of all metal products manufacturers in the post-war era pose many questions. The correct answers can be found only by careful investigation and study now.

Even if you contemplate no radically new product, your competitive position in post-war markets can be improved by taking advantage of time and cost-saving methods which have been developed during this period of war necessity. If you are planning new products the need for determining the best and most economical finishing methods should be a vital part of your program now.

Our Research Division will gladly help you. Just as in the speedy conversion to war production it helped many suppliers of vital war goods get started producing faster and better, it can help you be ready for speedy re-conversion to peace-time production. Your inquiry will be held in confidence and entails no cost or obligation.

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Degreasing Baskets

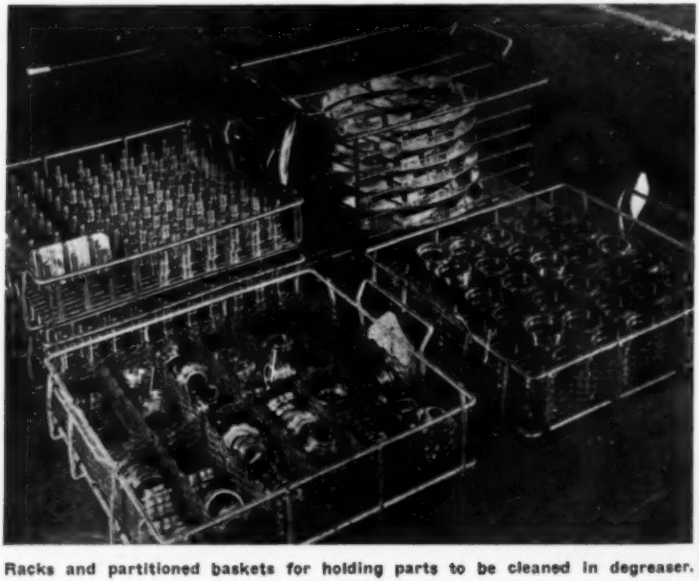
A problem frequently encountered in industry is breakage of castings with thin walls, fins and projections by rough handling in degreasing baskets. A related difficulty is the scratching and corroding of highly polished machined parts through contact with degreasing basket surfaces. Heretofore, the practice has necessarily been to use dgreasing baskets which either tend to damage the parts or could not of themselves, resist the action of organic solvents.

The recent development of durable, solvent-proof, rubber-like pad to line degreasing baskets provides castings and machined parts with a protective cushion while in the degreaser. Made of compar, a vinyl-resin derivative compounded by Resistoflex Corp., Belleville, N. J., the pads not only provide a cushioning effect but also are completely inert to the action of degreasing solvents, sulphur-base cutting oils, aromatic and aliphatic hydrocarbons, chlorinated hydrocarbons.

Unlike wood baskets, which pick up and hold small sharp metal particles, the compar pads have no harmful effect whatsoever on highly polished metal surfaces. Smaller wire degreasing baskets as shown in the illustration, which save handling parts, may be coated with a solution of the same resin. The coating is easily applied by a simple dipping process.

E. W. Christ, Vice President of Stanley Works, Dies

E. W. Christ, Vice President, Secretary and Director of Purchasing for the Stanley Works, New Britain, Conn., died June 1st. He was 68 years old. On May 3rd of this year he celebrated his 50th year with the Stanley Works. He was stricken with a heart attack. He is the father of Ed Christ of the Stanley Chemical Co. of East Berlin, Conn.



Racks and partitioned baskets for holding parts to be cleaned in degreaser.

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What "pH" Means

What is the term "pH," and what does it mean to production men in industry?—K. J.

The symbol "pH," along with a number, gives you an indication of the degree of acidity or alkalinity of a liquid solution—for example, a metal cleaning compound, a casein cold water paint or electroplating solution. We are not sure how the symbol was coined, but probably the "H" stands for or did stand for hydrogen or hydrogen ion, while the small letter "p" may have been used to represent "pressure of" or "power of," but not "percentage of." After all, we don't need to know how it originated nor why some other letters or symbol or word wasn't used, but we do need to know how it is employed today in checking up the acidity or alkalinity of certain important liquids that we use in the plant.

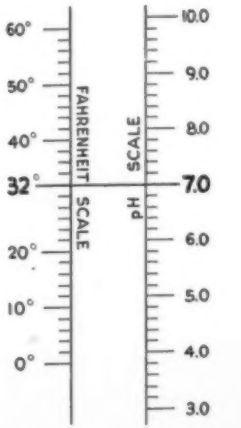
We believe that a clear explanation is revealed in the handbook, "The ABC of pH Control" (12th edition) published and copyrighted 1944 by LaMotte Chemical Products Co., Towson, Baltimore 4, Md. From this we quote the following:

"Everyone is familiar with the Fahrenheit thermometer. On this scale, 32° represents the freezing point of water. For illustration we shall assume that values above and below 32° represent degrees of heat and coldness respectively. Thus, any values higher than 32°, such as 34° or 40°, denote an increase in heat, the degree of heat increasing as the numbers increase. On the other hand, any values below 32°, such as 30°, 28° or 20°, denote an increase in coldness, the degree of coldness increasing as the numbers decrease.

"In a similar manner the degree

Questions and Answers

of acidity or alkalinity of a solution is expressed by the pH scale. Instead of being called degrees, as in the case of the thermometer, the units on this scale are called pH values. It is apparent that it is not necessary for a person to know the derivation of the term 'degree Fahrenheit' in order to determine the temperature of a solution by means of a thermometer. It is equally true that the worker need not know the derivation of the term



Compare these two scales to understand "pH" scale

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'pH' in order to use this method of measuring acidity and alkalinity. On the pH scale, a value of pH 7.0 represents neutrality. This means that if the material being tested has a pH of 7.0 it is neither acid nor alkaline.

"Following the illustration of the thermometer just given, any values higher than pH 7.0, such as 7.2, 7.4, 8.0, 9.0 or 10.0 denote alkalinity, the degree of alkalinity increasing as the numbers increase. Analgously, any values lower than pH 7.0, such as 6.8, 6.6, 6.0, 4.0 or 2.0, denote acidity, the degree of acidity increasing as the numbers decrease. The similarity between the Fahrenheit scale and the pH scale is shown in the accompanying illustration.

"A pH value is simply a number denoting the degree of acidity or alkalinity of a solution, and an operator will learn in a few days to use this term just as intelligently as he does the term 'degree Fahrenheit.'

"To give a concrete example, let us say that a solution has a pH of 7.6. The solution is of course slightly alkaline. If another has a pH of 8.2 it is more alkaline than the one of pH 7.6. It is therefore clear that an acid, such as hydrochloric, or an acid salt, such as alum, must be added to a solution of pH 8.2 to bring it to a pH of 7.6, and that larger quantities must be added to bring it to the neutral point of 7.0, or to an acidity of pH 6.6 or 6.0. Similarly, if a solution has a pH of 6.0 it is acid and it is necessary to add alkali, such as lime, soda ash, etc., to it in order to bring it to the neutral point of pH 7.0. Larger quantities of alkali must be added to bring it to an alkalinity of pH 8.0 or 9.0.

"In order that the worker may have some idea of the degree of acidity corresponding to various pH values, it may be stated that a solution which has a pH value of 5.0 is 10 times as acid as one with a pH of 6.0. Analogously, a solution of pH 4.0 is 10 times as acid as one of pH 5.0. Thus pH 4.0 indicates an acidity 100 times as great as pH 6.0. A similar relationship holds on the alkaline side of the scale. That is, a solution which has a pH of 9.0 is 10 times as alkaline as one which has a pH value of 8.0."

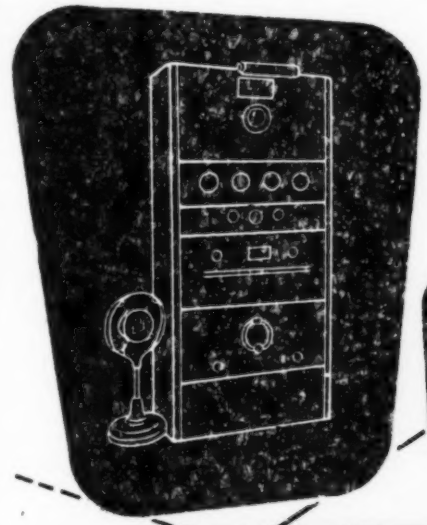
Peel-Off Coating on Plexiglass

THE Ford Willow Run Plant has used a "peel-off" protective coating on Plexiglass parts in the following manner: A 140-gallon dip tank was set up in one end of a standard spray booth, with iron pipes strung across the other end to support Plexiglass parts hung for film drying. A panel of infrared lamps was installed in the back wall of the drying section of the booth. The drying booth fan supplies cool ventilating air at the operator's end, and hot drying air where the coated Plexiglass is hung.

The operator picks up a piece of molded Plexiglass, to which has been affixed an iron hook through one of the drilled bolt holes, and dips the Plexiglass in the tank containing the transparent coating material. The coated Plexiglass is hung on one of the iron pipes at the end of the dip tank, to allow the rapid run-off of the coating to drain back into the tank.

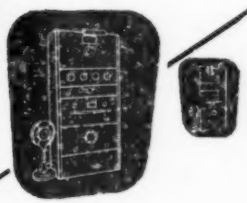
This operation is repeated until a sufficient number of pieces have

(Continued on page 100)



PRE-PRIORITY

SUPERIORITY



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Booklets Catalogs Circulars

Metal Cleaning Information

Many practical facts about various types of metal cleaners, plus diagrams of metal cleaning methods and equipment operation, are revealed in an 8-page illustrated booklet published by the Equipment Division of Magnus Chemical Co., Garwood, N. J. If you are interested write the company asking for the booklet about the Magnus portable, all-purpose, metal cleaning machine.

LaMotte Issues New pH Control Handbook

Celebrating its 25th anniversary, the LaMotte Chemical Products Co. of Towson 4, Baltimore, Md., presents a new, 84-page edition of its well-known handbook, "The ABC of pH Control."

Always informative, this attractive manual has been revised and enlarged in this, its 12th, edition to become the most comprehensive handbook yet published by the "Originators of Practical Application of pH Control."

Coating Food Cans For Going Overseas

General Industrial Finishes, Division of General Printing Ink Corp., 100 6th Ave., New York 13, N. Y., has prepared a small booklet showing pictures of food cans being coated with its olive drab rustproof can enamel, C-7950-B, covered by Quartermaster Specification CQD-200-A. The enamel is shipped in a concentrated form to which the operator adds a special reducer.

The machine illustrated is operated at normal room temperature and travels at a speed of 15-ft. per minute. Approximately 280 46-oz. cans are delivered per minute. The enamel is completely dry-to-handle within five minutes elapsed time from coating to packing. At the unloading end the enamel is sufficiently dry to be handled by the carton loading operators.

Clorafin Booklet

A new technical booklet describing the unusual properties of Clorafin 42, plasticizer, and Clorafin 70, resin, used in the production of fireproof, waterproof, and weatherproof coatings for fabrics, has been issued by Hercules Powder Co.'s Cellulose Products Department, Wilmington, Dela.

New "Infra-Red" Gas Burner Catalog

A new 114-page catalog, rich in illustrations and descriptions of Burdett "Infra-red" principle gas burners and combustion equipment, also presenting a wealth of engineering and reference material, has just been released by the Burdett Mfg. Co., 21 N. Loomis St., Chicago 7, Ill.

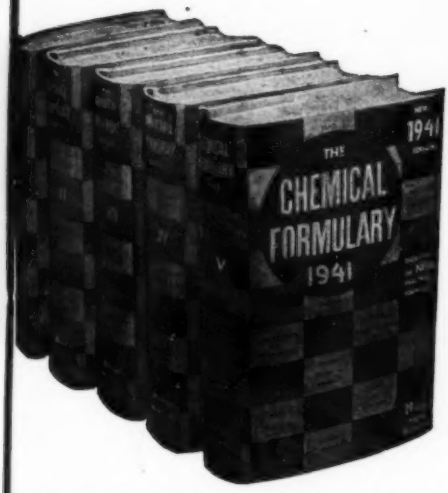
This new catalog, due to its extensive and detailed presentation of valuable information, will be sent only to Distributors and Industrial Sales Engineers upon request and written on their company stationery.

It includes burners, mixing equipment, valves, gas pressure regulators, motors and blowers, pilot safety devices, temperature controls, electrical accessories and general engineering data such as velocity pressures, motor ratings, measurement of electrical power, calculating power requirement tables and charts, heat losses, thermal capacity of gases, etc.

Publishing of this new distributor and engineering catalog was prompted by the company's plans for greatly extended sales efforts from coast to coast and the addition of many more engineer-representatives to cope with both the present heavy war effort demands and future industrial requirements.

It is claimed by users of Burdett "Infra-Red Principle" gas burners that as much as 300% increase in production has been effected in most industries by this heat process and the cost of operation has been materially reduced at the same time.

The secret of these startling results is said to lie in the fact that 99% of all radiation from this type burner is "infra-red" ray and that no heat loss takes place between the burner and the product.



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Editorial

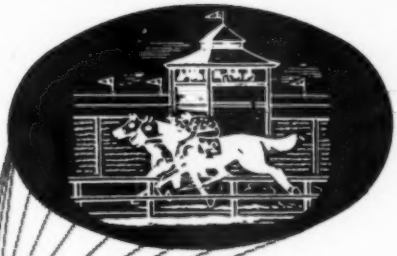
Let's Return to Quality Production When . . .

An important man in an important speech recently stated that, "The coming demand for intense production may be a pitfall for us if we give so much attention to volume that we fail to produce the quality the public inherently expects of our finish. While we must meet the demand for much in a short time, that much must be our best."

This is something that deserves more than just thoughtful consideration. It is a program that should be subscribed to and put into action 100% by every manufacturer. The quality of most civilian goods and services has deteriorated as the war has gone on. People are accepting inferior goods, various kinds of substitutes, and doing without many things now because that is the thing to do during war time.

One of the very hopeful things people are looking forward to after the war ends is the availability of quality goods again. They haven't forgotten what quality materials are like. On the contrary, the more they think of it and talk of it, the more they are actually exaggerating the merits and advantages of many things they used before the war. What they accept now in the spirit of cheerful sacrifice, they are going to resent very emphatically after the war.

Concerns that have established a good reputation and who have any hope for their future will make



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every effort to obtain what it takes to manufacture pre-war quality or better than pre-war quality products. They will be keeping faith with their customers—past, present and future—and their volume of business will show a steady substantial increase.

Right Colors Promote Safety; Boost Morale

The best and newest way to promote good housekeeping is by the scientifically developed use of bright paint colors in all industrial interior surfaces, including even floors and machines. So declared R. A. Massey, Du Pont color expert, speaking before a joint meeting of the American Institute of Electrical Engineers and the Illuminating Engineering Society recently.

Many factory interiors already display the new scientific color systems. They include government arsenals, naval shore stations and major war plants. Worked out in a 3-year Du Pont research program to improve seeing conditions in industry, the most favored color scheme for machinery has proved to be light gray and light buff. Floors often are painted white, stippled with brown, while walls are finished in two high light-reflecting colors.

"Surroundings are cheerful and worker morale is boosted," said Mr. Massey. "More illumination is utilized, because the entire interior is treated with paint to become one vast reflector. Better visual conditions mean fewer production errors and more rapid output.

"The good-housekeeping dividend was unexpected. When the so-called 'Three-Dimensional Seeing' technique, recommending lighter paints than were previously considered practical in industry, was first installed in plants, we half anticipated some grumbling from maintenance men.

"Yet in practice it has worked out that workers take pride in their bright machines and keep them clean. Tools and greasy rags are not so carelessly tossed aside on the floor to add gray hairs to the plant safety engineer. Dark objects on light colored floors are so conspicuous, moreover, as to reduce greatly the slipping and stumbling hazard."

Star For "E" Flag

The men and women of the Nubian Division of The Glidden Co., Chicago, Ill., have been awarded a star to place on the Army-Navy "E" flag which was awarded them last December.

Post-War Prosperity Up to Inventors

"Wanted — Peacetime products for 1,500 war plants." It is up to American ingenuity to meet this challenge! The Defense Plant Corp. has furnished the money to build and equip 1500 new plants. A study should be made now as to peacetime articles that can be made in these plants and we must start now, not when Hitler has surrendered, to develop new articles which the people will need.

The welcome mat awaits the inventor. Never before in history has the time been so ripe for new inventions. The American people are counting on inventors, whether they work in the cellars of their homes or in million-dollar laboratories, to keep the postwar ghosts out of our factories.

Planning now for a better world will be an encouragement to the men who are fighting for us.

The idea that inventors are born, not created, is a fallacy. People are not born inventors any more than they are born with a knowledge of how to run an automobile. An inventor is simply a person with imagination.—R. P. BROWN.

Foreman Registers Some Kicks

(Sometimes we need our attention called to what people are kicking about, even though some elements in the subjects are controversial. If an improvement is needed and a few kicks help get it, okay.—Ed.)

BRIEFLY, my quick comments on the several subjects you outlined are as follows:

1) Surface preparation or cleaning before coating: In regard to furniture and other wood products, there is much to be desired in the sealers, stains and lacquers used in the finish coats. Some of the furniture, cabinets and other wood parts of this trade are simply awful. I look forward to some improvement as soon as manufacturers of finishing materials hear from the American housewives who are about fed up with the quality of these finishes. Right here I want to say I am not blaming the finisher so much as I am the employer who, as in so many cases, is figuring his cost in fractions of a cent rather than with any eye to lasting beauty and durability.

2) Surface preparation and cleaning of metals before coating: We have come a long way in a few years. However, what is still needed in this field are more improvements in automatic cleaning machines. Most of the degreasing machines are just that, but as cleaning devices many of them have much to be desired.

3) Protection and surfacing of plywood: This is so simple it hardly merits comment, but here again the question of material enters the picture. Start with good stock properly laminated, sanded and dusted. The finisher can turn out a real job provided he begins with a wash coat of shellac or suitable sealer—brushed in, not on. Allow sufficient time to dry, sand lightly, dust off, and apply either a paste or liquid filler. Moss off the excess filler and allow the filled surface time to dry. Then sand and dust off. From here on you can proceed with either spray gun or brush, using varnish, enamel or lacquer. Use any number of finishing coats desired and you will have a beautiful, enduring job.

4) Methods of applying coatings: These vary with each industry and we need look for little change in them. There is a tendency among some manufacturers of tool machinery to finish new machines with the pebble finish, thus avoiding some labor and material in building up a nice surface. This easy method is all right on some machines . . . but I believe that large expensive machines will be finished smooth again after the war. The war has taught finishers to get along with many substitutes and these will probably have to be used up before we get some of the old and better materials.

5) Spray equipment companies have done a truly remarkable job in the layout of equipment for streamlined operation, and these improvements, accessories, etc., will be incorporated in their schedule when we get back to peacetime economy.

6) Testing and preparing material before using: This is a headache to most finishers, but the fellows who know their jobs will get by. They will have to learn how to do it quickly, accurately and regularly. After all, it is important.—J. J. T.

Green Light—As these lines are written, the word anxiously waited by American industry has just been flashed at Washington. Donald M. Nelson, W.P.B. chairman, in giving the go-ahead signal authorizing manufacturers to acquire sufficient materials and components to make and test a single working model of any product planned for postwar production, has answered the long-standing pleas of our business leaders.

Lifting of restrictions while war production is still in progress, Nelson admitted, might permit some concerns to enter civilian markets before competitors with large forward war contracts are able to follow. "It is in the public interest," he stated flatly. "I see no other way in which large-scale unemployment can be averted."

* * *

Warning to Politicians—"America's civilian soldiers, sailors and marines are realists because of their military training. That's why they understand no factory can employ veterans to produce goods that can never be sold—that no firm can employ veterans as salesmen if the public lacks the necessary purchasing power."

In view of the widespread discussion of the "soldier vote" and the "veteran vote," as affecting business activities for the next four years, these observations appearing in *Foreign Service*, the magazine of the Veterans of Foreign Wars, deserve our thoughtful attention.

Continuing in this vein, the editorial adds these words of warning: "The men serving in this war will never swap their votes for a synthetic prosperity created by public funds spent for boondoggling projects or leaf-raking jobs. . . . G. I. Joe knows his postwar welfare will be best served only when organized labor, management and the federal government agree to work hand-in-hand for the common good."

* * *

Reasons for Optimism—Although the days of "windfall business" are almost gone, says W. T. Bell of the Goodyear Tire and Rubber Co., the pent-up demand for more than twenty billion dollars worth of refrigerators, autos, vacuum cleaners and similar products presages a postwar boom of at least five or six years.

The money for these purchases, he points out, is already in the hands of the American people—in the form of War Bonds and other savings. "By comparison," Bell continues, "people had only three to five billions after the first World War, and many were actually in debt when the Armistice was signed."

* * *

High Wages Can Remain—A problem worrying thousands of American manufacturers revolves around this vexing question: "Can we maintain a wage level substantially higher than existed before the war, and still retain a healthy national economy?" An encouraging answer to this query was given by McKinsey & Co., management consultants, in a recent review of the subject.

"The current high-wage levels

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which prevail throughout industry generally rest on the sound basis of increased manhour output," says this firm. "In other words, industrial workers in well-managed companies are being paid extremely high hourly rates of pay because in most cases they are earning them in terms of actual unit costs."

McKinsey's studies show a 30% to 50% increase of production per man-hour over the figures of 10 to 15 years ago, with a proportionate reduction in unit labor costs. This has not been a universal fact, however, for the survey acknowledges that "soldiering" has been a factor in a small but tangible percentage of war plants.

* * *

Miracle Wood—A 10% solution of sulphuric acid is poured on the surface, with no visible effect. A pool of alcohol is ignited, and the flame leaves no damage. A material that withstands these extreme conditions is Pluswood, produced at Oshkosh, Wisc.

This product is described as a "wood alloy." It is virtually scratch-proof, and requires no polish, wax or varnish. The opportunities in postwar markets for Pluswood, and developments of competitive companies, appear to open up unlimited horizons for the furniture industry. Wood, after all, may turn out to be the real "miracle material" battling successfully for peacetime sales against plastics and the light metals.

* * *

Civilian Aircraft — Despite the dire predictions of the fate awaiting aviation manufacturers when peace comes, Douglas Aircraft is going ahead, serenely and confidently, in planning for postwar operations. The company's brave faith in the future was underscored a few weeks ago by the successful financing of a $75,000,000 credit for prospective operations, *without* the federal government's guarantee.

One Douglas executive summed up the firm's determination when he put the case simply: "We're not going to build busses or sewing machines or washtubs. We're going to build airplanes!" Douglas is expected to emphasize civilian models of its renowned 50-passenger, 4-motored, C-54 army transport, along with smaller planes for short hops, to feed transcontinental routes.

* * *

New Plastics—Two leading industrial firms have unveiled promising new plastics in the past month. Monsanto Chemical Co. is presenting Cerex, said to be the first plastic that will hold its shape and strength in boiling water or under high temperatures. It nevertheless can be molded by the cheapest mass-production methods. In a Manhattan demonstration, this interesting product successfully withstood boiling in water and sulphuric acid. One postwar possibility would be the use of Cerex in Venetian blinds exposed to the sun.

Westinghouse has introduced four new war-born plastics. Perhaps the most newsworthy to readers of this magazine will be Fosterite, already being used by 40 manufacturers of radio and radar equipment for sealing out destructive moisture. Fosterite contains no solvent which, in the older processes, evaporated during baking—causing thin cracks and openings to appear. Westinghouse also claims to have an improved synthetic replacement for shellac.

* * *

Automobiles When — Since the pattern of reconversion in the great automobile industry will probably

THE SUPERFORTRESS B-29

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Here we have a magnificent example of America's creative, technological and production genius. Only a free people, with free enterprise and proper incentives could create and produce so fine a ship in so short a time.

The men and women who helped to build her say to the gallant men who fly her, "May She Help Speed the Day of Complete Victory."

Listed here are a few of the war products now being coated with our materials. Phone, wire or write and let one of our finishing experts help you "keep production rolling."

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set the pace for many other consumers' goods plants, the WPB's plans for passenger car manufacture are being followed with keen interest. Possibly by the time these lines appear, an outline of the shape of things to come will have been released in Washington.

Conversations between Government and Management have been under way for more than six months, pertaining to an orderly plan of transition. As the auto industry holds about 30 billion dollars worth of war contracts, the details present a nightmare of complexity.

John H. Middlecamp, director of WPB's automotive division, has said that a starting quota of perhaps 2,000,000 cars can be set for the industry when reconversion begins. With over 1,200,000 persons now employed by the industry, the impact of the pending decisions will be enormous.

* * *

Outlook for Gas Appliances—In the opinion of the American Gas Association's postwar planning committee, gas home-heating will be widely accepted in the years ahead, and with it a high percentage of other applications, including gas air-conditioning.

This trade group has made a survey of sales prospects for its field which adds up to a heartening picture. Eight million gas ranges will be needed to replace old equipment now in use, we are told, while 650,000 ranges a year will be sold to new home builders.

Here are some additional facts uncovered in this cheerful report, pointing to a bright future: Five million automatic gas heaters should be sold to replace less satisfactory equipment, and besides there is a market for the sale of 2,000,000 gas refrigerators.

Words from the Wise—If we hold to unreasonably high prices after the war, we will not last long in our home market nor in world competition. That was the solemn warning handed to business a few weeks ago by John M. Hancock, co-author of the Baruch-Hancock report on postwar adjustment policies.

"Every man in business knows that there is a price which will bring the largest attainable volume, the greatest employment and the greatest profit," he continued. "America is going to wind up this war with the greatest productive capacity in the world. Whether or not it is going to be able to compete in world markets will depend on the *attitude of mind of our people.*"

* * *

For New York Visitors—Readers of INDUSTRIAL FINISHING are reminded that free tickets for many leading radio broadcasts are obtainable on request. Among the sponsors continuing their cooperation are: The Texas Co., Camel Cigarettes, General Motors, and the Coca-Cola Co. When contemplating a trip to Manhattan, drop a line to: *Lawrence H. Singer, 130 West 86 Street, New York 24, N.Y.*

Broadway plays worth your attention include: The Theatre Guild's "Jacobowsky and the Colonel"; Dave Wolper's musical hit, "Follow The Girls" with Gertrude Niesen; and Elizabeth Bergner's long-run success, "The Two Mrs. Carrolls."

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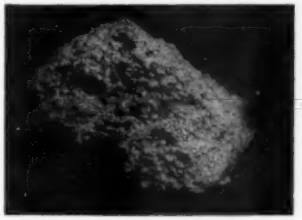

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Peel-Off Coating on Plexiglass

(Continued from page 86)

been coated to fill the drain area in front of the dip tank. Then the operator slides the coated Plexiglass to the far end of the booth where the heated air will complete the drying. As soon as the coating is completely dry, the Plexiglass is removed from the booth and may be stacked without any further protection.

By this method, one operator can dip coat sufficient Plexiglass for approximately 10 B-24 bombers per day. One gallon of the solution will cover approximately 200-sq.ft. of Plexiglass. The dip method of application results in an even uniform coating approximately 0.0008-in. thick. Handling is kept to a minimum because both sides of the Plexiglass are coated in one operation. Whenever the protective film is accidentally broken, it is immediately repaired by application of some of the coating material, using a small paint brush. The brush handle is set through the cover of a small jar containing the coating material.

After the final painting of a ship, the protective film is removed by scraping the center of each window with the thumb nail. The coating is then peeled toward the edge of the Plexiglass, making it impossible for any chips, filings, etc., to contact the plastic surface.

Should the film become so hard during the interval between its application and removal that its peeling characteristics are impaired, its elasticity can be restored by spraying the coated Plexiglass with a very fine mist of water, using a regular paint touch-up spray gun. Thirty minutes is then allowed for the moisture to completely evaporate. The film can then be removed as outlined above.—P. K.

A Thiokol-base tape, developed by the Presstite Engineering Co., is solving the important problem of sealing riveted fuselages and gasoline tanks against leakage.

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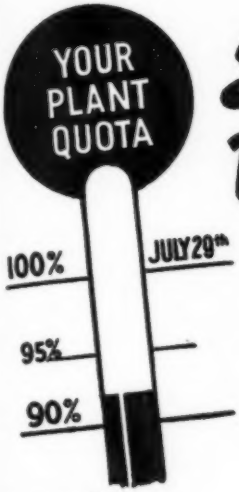

Stay at Your Battle Stations!

MANAGEMENT · LABOR

—The 5th War Loan Drive is still on. July 29th is the last payday in the drive.

The U. S. Treasury has set the overall goal at $16,000,000,000-$6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—*and it must be raised!*

Keep fighting. Tighten up your 5th War Loan Drive organization. Step up your solicitation tempo. Drive! Drive!! Drive!!! Hit your Plant Quota's 100% mark with a bang that'll proclaim to all the world that the U. S. Home Front is solidly in back of the Fighting Front.

Need help? Need ideas? Call on the Chairman of your War Finance Committee.

Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an *average* $100 *cash* (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. Employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

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1,000 employees x $100=$100,000 Cash Quota

Regular Payroll deductions during the eight weekly payroll Accounting Periods of June and July.	30,000
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★

JULY 19, Germans retreat across the Marne; Sept. 13, U. S. Troops take St. Mihiel; Sept. 20, battle of Meuse-Argonne begins; Sept. 27, British attack breaks Hindenburg line; Sept. 29, Bulgaria surrenders; Oct. 6, U. S. troops capture St. Etienne; Nov. 7, U. S. troops reach Sedan; Nov. 9, Kaiser abdicates; Nov. 11, Armistice signed in Marshall Foch's railway car. All this happened in 1918. Let's hope that it is happening again, right now—but this time, no armistice please.

• The Cross of Lorraine, added to the French Tricolor by the Free French in 1940, is symbolic of St. Joan of Arc, who liberated France in the 15th century.

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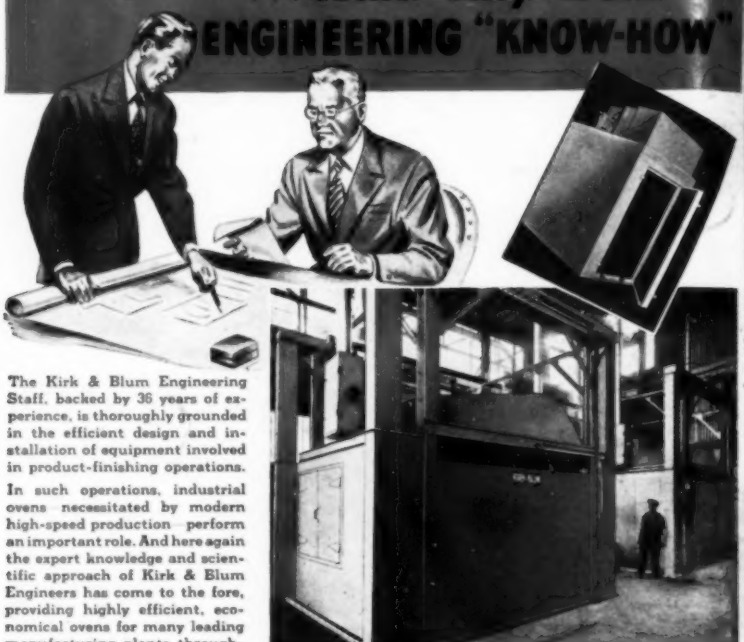

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